THE IRON AGE

New York, November 30, 1916

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Electric Ovens in an Automobile Plant

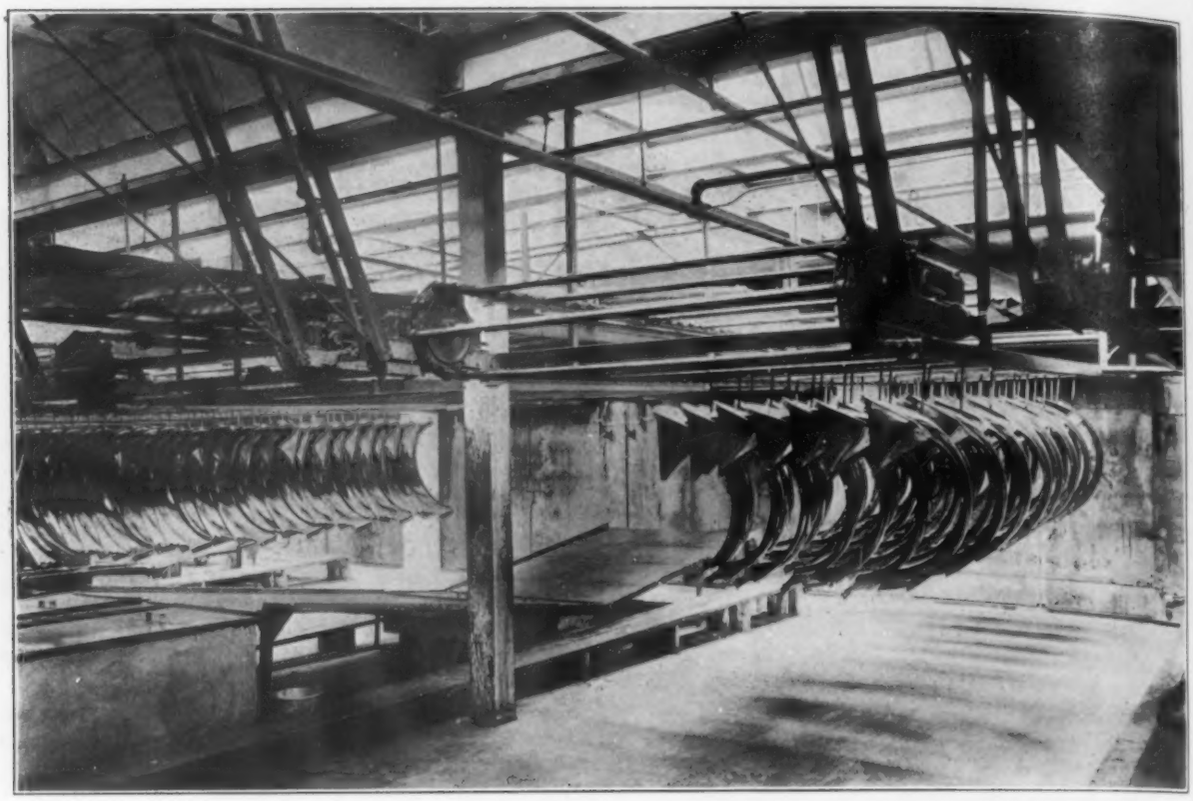
New Type with Conveyor Equipment at Willys-Overland Plant for Baking Enamels — Some of the Steam-Heated Ovens

ONE of the recent innovations in the manufacturing methods in the automobile industry is the use of electric ovens for drying or baking enameled parts. Electrically heated ovens in smaller sizes are also now being used in some other manufacturing plants. The first installation of electric ovens for drying enameled automobile parts was made, it is believed, by the Willys-Overland Company, Toledo, Ohio, something over a year ago. This company has recently installed a large number of additional ovens and at present there are fifty-two electric ovens in the Overland plant. These are in various sizes, depending upon the material they are to handle. They take no less than 7000 to 8000 kw. of electric energy.

One of the Batteries of Electric Ovens. These for Baking Car Bodies. Local switchboards and temperature control apparatus are provided as indicated

Among the new oven installations at the Willys-Overland plant is a battery of conveyor ovens of a new type. Continuous open-end steam-heated ovens of the conveyor type and with long heating chambers, in which the frames and chasses are dried during progressive assembling while being carried very slowly on conveyors through the ovens, are now used quite generally in the automobile industry. The conveyor system is now being applied to electric ovens in a somewhat different manner, conveyors being used to take a load of small parts into the oven where they remain stationary until the baking operation is completed, when the conveyor carries them out the opposite side of the oven. This conveyor type of oven is particularly interesting from an economical standpoint in that it is found to effect a great saving in time and labor and to increase greatly the oven capacity.

The Willys-Overland installation of conveyor type of electric ovens includes a battery of ten ovens 21 ft. 6 in. wide, divided in two compartments, 21 ft. 4 in. deep and 8 ft. in height. These are used for fenders, dust-pans, hoods and various other



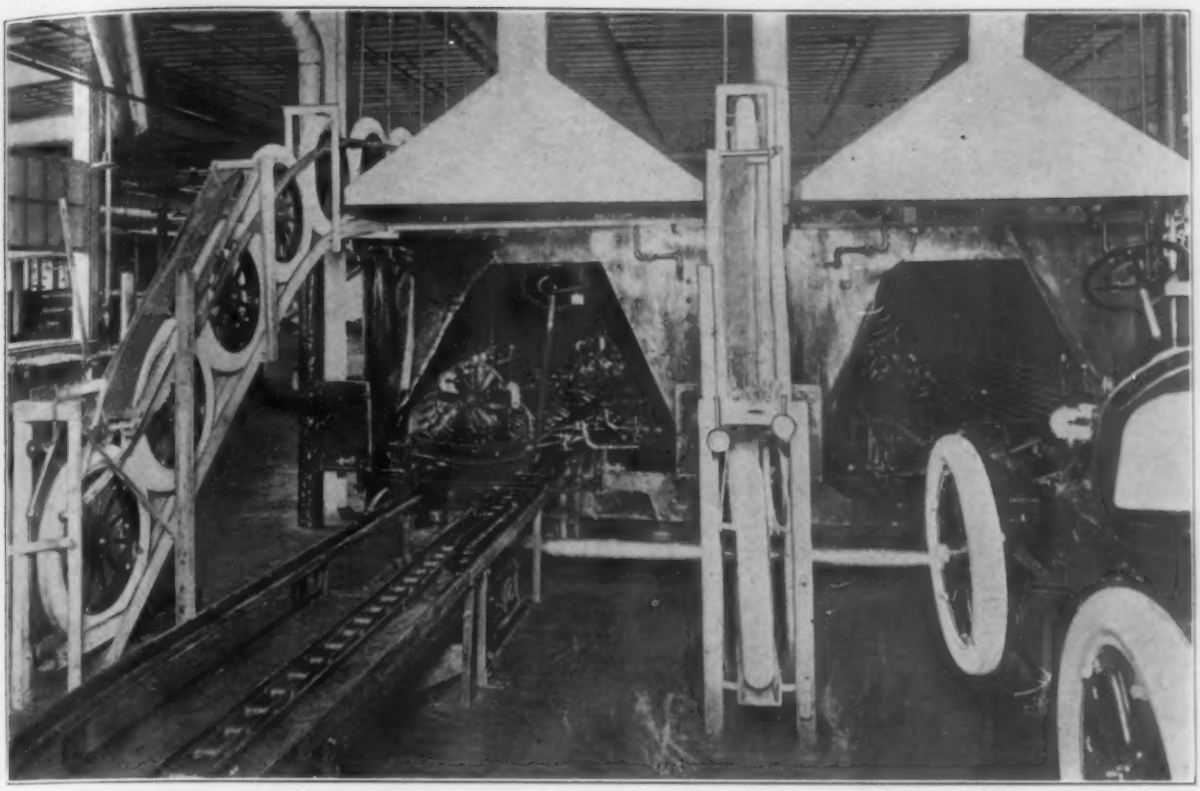
After the Parts Are Dipped in the Enamel They Are Hung on the Cross Bars of the Conveyor, Ready to be Carried into the Ovens, the Fronts of Which May be Seen in the Background of the Picture

parts and have a capacity for drying the parts of 1000 cars per day. Under the method generally followed, the parts are dipped and then are carried into the oven one by one. That method makes it necessary for the oven to cool off sufficiently for the workmen to go inside with the parts and from 40 to 60 min. is lost in bringing up the heat after the oven is filled, to say nothing of the time required in carrying the individual parts into and out of the oven.

Under the new method with the ovens equipped with mechanical conveyors the parts are dipped in the first coat of enamel at the side of the conveyor and are then hung on the conveyor over drip pans in front of the oven doors. After the conveyor is loaded the oven doors are opened and the conveyor is set in operation and the load is carried into the oven. In this way the maximum capacity of the oven is carried into it at one time and it is necessary to keep the oven doors open only a short time. While one conveyor load is being baked another load is being dipped and placed on a section of the conveyor outside of the oven.

When a load of freshly enameled parts goes into the oven the conveyor carries those parts just baked out the opposite side, and if they require a

The Electric Heating Units Are Distributed Between the Two Compartments of the Body Baking Ovens, for Example, as Here Shown

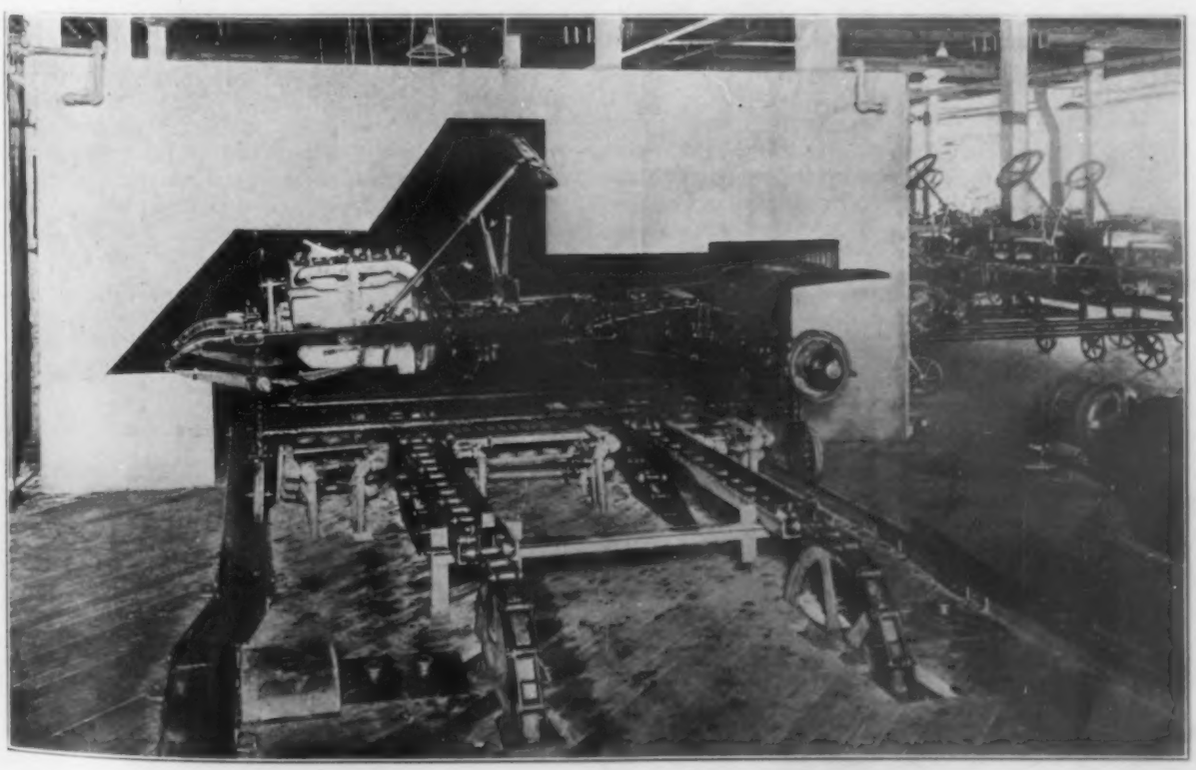


The Classes Are Shown Coming from the Steam Heated Ovens Which Are Also Used in the Plant, Ready for the Application of the Wheels

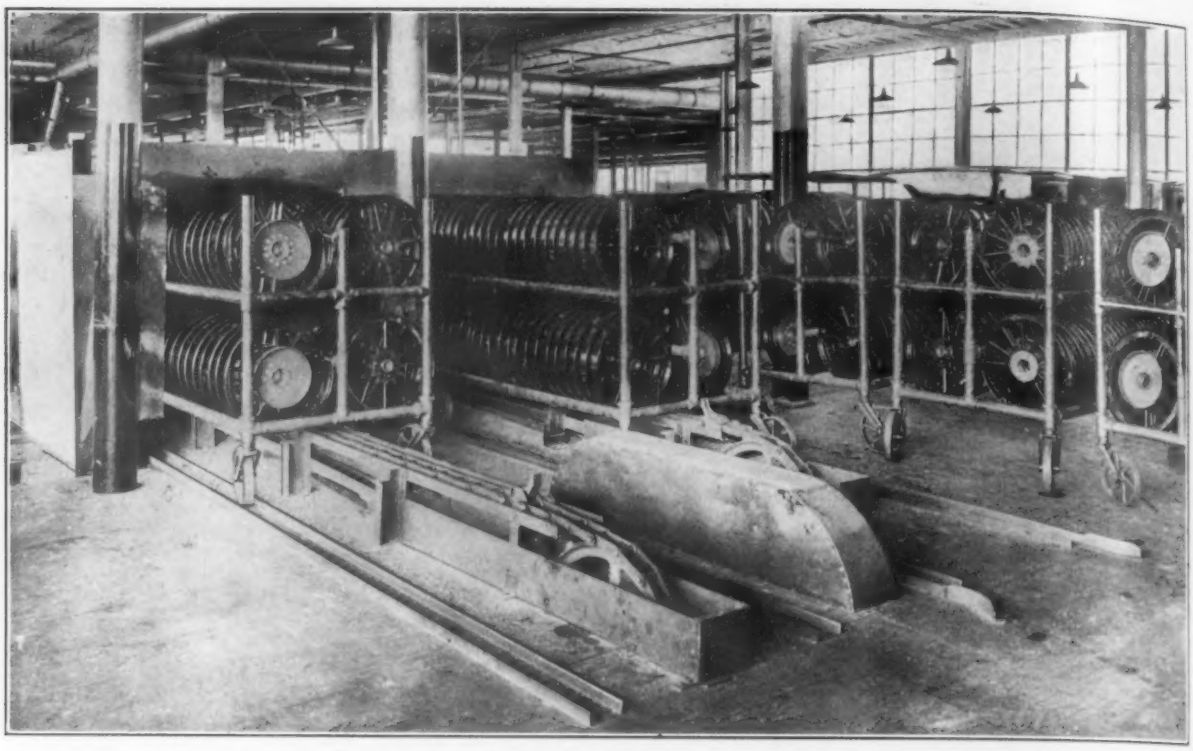
second coat of enamel they are again dipped on that side and come back through the other half of the oven in the opposite direction. It will be seen from this that both the first and finishing coats are dried in the same oven, which, although a departure from the usual practice, is found to work out very satisfactorily.

The conveyor is of the chain type 8 ft. wide and 64 ft. long, each end extending approximately 22 ft. outside the oven and providing outside loading space at each end. The conveyors are driven from one line shaft that extends in front of the ovens, each conveyor being operated independently by means of a clutch. It takes 2½ min. for the conveyor to move approximately 21 ft. to carry a fresh load into the oven and to deliver the baked load, and during that time while the doors are open the oven temperature falls 85 to 100 deg. It requires only about 5 min. to get the temperature back to the average temperature of 350 deg. required for baking. It is said that the ovens have a capacity of about three times that of the ordinary type of ovens without the conveyors.

For drying bodies there are two batteries of ten electric ovens each, one battery for drying the first coat of enamel and the second battery for the fin-



In This Steam Oven, the Chasses Ar · Carried Sideways on the Conveyor



Special Racks Are Used for Carrying the Wheels Which Are Drawn Through the Oven by the Chain Conveyor

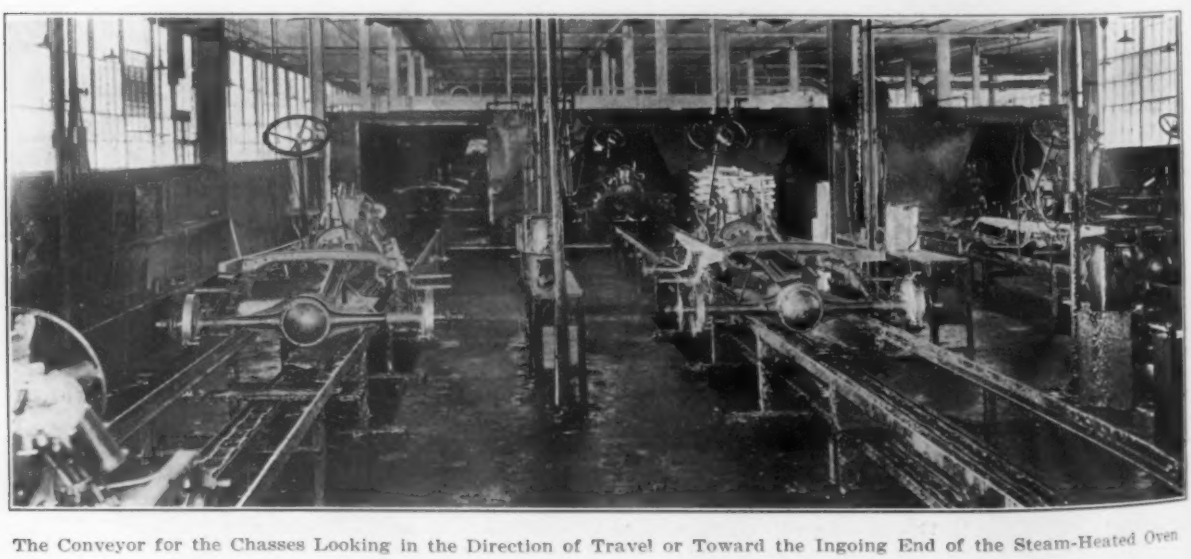
ishing coat. These ovens are 8 ft. high, 40 ft. deep and 21 ft. 6 in. wide, making the length of each battery 215 ft. For drying the fenders of one model of car, there is a battery of six electric ovens 20 ft. wide and 20 ft. deep. These ovens have a capacity for baking 500 sets of fenders with two coats of enamel in a day. There is another battery of ten electric ovens for fenders and four electric ovens for hoods. Two electric ovens are used for drying the running boards, shields, aprons, under panes, etc.

Two of the illustrations show a battery of chassis drying ovens. These are steam heated ovens about 150 ft. in length. The chasses, after being spray painted, are carried through the oven on a conveyor, taking about 50 min. to pass through. The ovens are kept at a temperature of about 180 deg. The assembled wheels are carried by gravity to the discharge end of the oven to be assembled to the chassis, as shown in one illustration.

While the first cost of the electric ovens is much greater than gas-fired ovens and the cost of operation is higher, it is found at the Overland plant that this increased cost is fully offset by the increased efficiency, quicker handling of material, greater production for the same amount of oven space, improved work and lessening of the fire risk. It is stated that the required temperature is attained much quicker than in gas-fired ovens. With the regular electric ovens without conveyors, the first coat of enamel is baked in 1 hr. 10 min. and the finishing coat in 1 hr. 40 min., a total of 2 hr. 50 min., as compared with 4 hr. 15 min. with gas-fired ovens, which require 1 hr. 45 min. for the first coat and 2 hr. 30 min. for the finishing coat.

In the case of the conveyor type of ovens there is a further saving of time. In these the first coat is baked in 45 min. and the second coat in 1 hr. There are no dust particles and oils in the process of combustion to come in contact with the work while it is being baked. No draft is required, a small flue sufficing to carry all the fumes from the enamel.

The heating units are 14 in. long and 14 in. high and 4 in. in thickness. Each unit is made of eight coils or sections of flat resistance ribbon wound on oblong spools. These units are mounted on iron racks and are placed at each side of the ovens. The wide two-compartment ovens have a row of heating units in the center between the com-



The Conveyor for the Chasses Looking in the Direction of Travel or Toward the Ingoing End of the Steam-Heated Oven

partments. Electricity for heating the ovens is furnished by the Toledo Railways & Light Company, being delivered to the plant in underground cables at 23,000 volts, and the current is 3-phase of 25 cycles. For use in the ovens it is stepped down to 440 volts. The heating units are of 10 kw. capacity.

From 9 to 42 of the units are used to heat one oven, the energy required for each oven ranging from 90 to 420 kw. Each oven is provided with a Taylor Tycos electric contact control instrument by means of which an even temperature is kept within a range of 10 deg. Each oven is provided with a switchboard, this being located in front of the ovens except in the case of the conveyor type, which have switchboards at one end of the battery. A thermometer and time dial are located on the door of each oven. When the oven doors are open the electrical current is automatically cut off.

The ovens were built by the Young Brothers Company, Detroit, and the heating units were furnished by the General Electric Company. The conveyors in the electric and other types of conveyor ovens were designed and furnished by the Link-Belt Company.

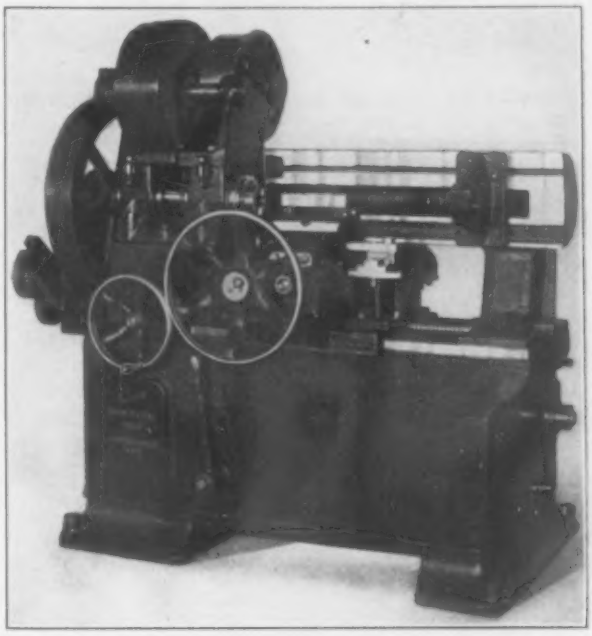
Relieving Machine for Formed Cutters

To provide straight, peripheral, side and end relief for formed cutters having a maximum diameter of 13 in., the Becker Milling Machine Company, Hyde Park, Boston, Mass., has placed a backing-off machine on the market. Cutters having any number of flutes from 3 to 12 inclusive can be relieved, as well as those having even numbers of flutes from 12 to 40 inclusive. In addition it is also possible to hold hobs and worms, the gearing employed for this purpose being readily detachable when not in use.

The machine, which is of rigid construction reinforced by a number of heavy ribs, is of the arm type with special ways. The tailstock, which is maintained in alignment by two T-slots in special ways at the back of the bed, has a maximum adjustment of 24 in. and four clamping bolts are relied upon to lock it in any desired position. The relief, which ranges from 0 to ¼ in., is provided by a single-throw cam at the back of the machine, which is held rigidly in place by the camshaft supports. A tapered gib is provided to take up the wear on the cam rolls and is relied upon to insure a positive throw. When hobs are being given a clearance on the machine, this cam is thrown out in reversing.

The spindle is a piece of crucible steel 3¾ in. in diameter at its largest point. It runs in solid phosphor-bronze bearings having means to compensate for wear and is driven through a spur gear mounted directly upon it. A No. 13 Brown & Sharpe taper hole is provided in the spindle which is bored to accommodate a ¾-in. draw bolt. Clutch drive is relied upon to insure positive rotation of the cutter that is being relieved. The tool holder block is set on a 30-deg. slide plate and is operated by a handwheel at the side of the machine to raise or lower the cutter to the required adjustment. The capacity of the block is for tools from ¼ to 1 in. in thickness, which are fed to the work by a differential handwheel. This arrangement, which makes use of the differential for fine feed and is thrown out to give direct quick adjustment, it is pointed out, furnishes accurate control. A handwheel operating bevel gears on the carriage screw provides a longitudinal adjustment up to 12 in.

In operation the cutter to be formed can be placed in position with relation to the forming tool without loosening bolts or nuts by operating a worm meshing with a wheel on the camshaft. Peripheral and side relief are provided by the same cam and a micrometer attached to the periphery relief slide, it is explained, gives a means for resetting the tool accurately when the work is changed. A separate cam at the end of the bed provides the end relief. The tailstock will accommodate either a collar or a



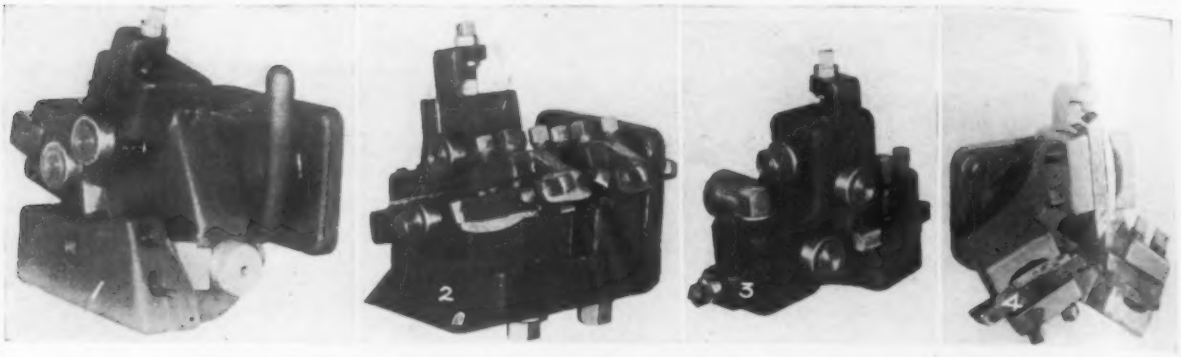
Formed Cutters Up to 13 In. in Diameter and Having from 3 to 40 Flutes Are Given Straight, Peripheral, Side and End Relief by this Backing-Off Machine

center bearing, according to the nature of the work being handled. The former is recommended for heavy cuts on a long arbor to insure rigidity by supporting the arbor near the work, while the other is intended for use where a short arbor is being used on small work.

The machine is arranged for single-pulley drive through a 4-in belt, a set of spur gears providing for three speed changes. If desired, the machine may be motor driven by a 3-hp. adjustable-speed motor having a range of from 500 to 1500 r.p.m. With this arrangement the motor is mounted on a bracket at the back of the machine.

A friendly receivership action has been instituted against the Termaat & Monahan Company, Oshkosh, Wis., gas engines, machine tools and shop specialties, and the Oshkosh Savings & Trust Company has been placed in charge of affairs. The company is filling a large order for the Lodge & Shipley Machine Tool Company, Cincinnati, and the proceedings arise principally to bring this contract to a successful conclusion. Its indebtedness is $132,000, but the assets are conservatively valued at $242,000. It employs 140 machinists and the plant will be continued in operation under the receivership. W. J. Koehn is president.

The Otto Coking Company, Inc., 6 Church Street, New York City, is rapidly completing the shipment of material for the new battery of 50 by-product coke ovens to be erected by the Mitsubishi Goshi Kaisha at Kenjiho, Korea. These ovens will furnish coke for the blast-furnace plant now being erected at that point. The company has also received a contract from the Woodward Iron Company, Woodward, Ala., for the erection of 60 by-product coke ovens. These ovens will have a capacity of 13 net tons of coal and will operate on an 18-hr. coking time. The new battery is scheduled to start operation about July, 1917.



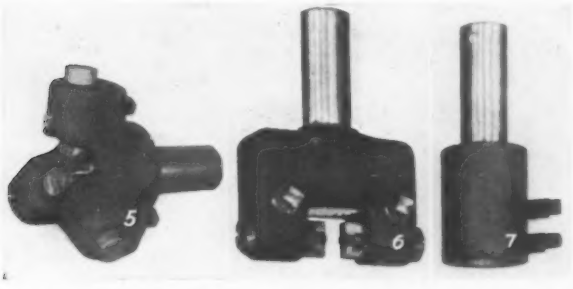
The Single (1) and Multiple Cutter (2) Turning, Pointing (3) and Adjustable Hollow Milling (4) Tools Used for Machining Bar Stock

SCREW MACHINE EQUIPMENT

Tools Developed by the Foster Machine Company for Its No. 5 Machine

BY OSKAR KYLIN

To increase the range of work which can be handled to advantage on its No. 5 screw machine, the Foster Machine Company, Elkhart, Ind., has designed and is now building a complete new line of tools. With these tools almost all kinds of chucking work within the capacity of the machine



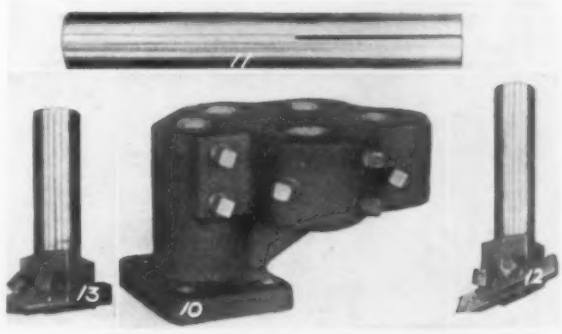
The Center Drilling (5) and Knurling (6) Tools and a Holder (7) Having a Floating Device to Compensate for Errors in Alignment Between the Hole in the Work and the Turret Center

can be handled. The machine is built in two different styles with a back geared cone head and an all-geared head, the latter having been illustrated in THE IRON AGE, Sept. 21, 1916.

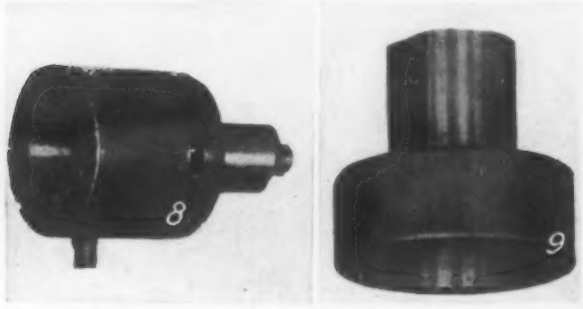
Probably the most important and most widely used of all screw machine tools is the one that is commonly known as the roughing box or single-cutter turning tool (1). The two features of this tool that stand out prominently are its rigidity and convenience of operation. The cutter is held so as to insure the maximum economy of the high-speed steel employed and the two roll jaws are independently adjustable and are secured rigidly to the tool body by a bolt, the body being split for this purpose. The cutter slide is equipped with a release operated by the bent handle in front of the tool to prevent the work from being marred when the tool is being withdrawn. This handle also serves to bind the cutter slide rigidly to the tool body. The slide operating screw is equipped with a graduated dial for convenience in setting. The multiple-cutter tool (2) is also characterized by a high degree of rigidity. In the illustration the tool is shown equipped with two double holders enabling four cuts to be taken at one time and one roller back rest, although three double tool holders for taking six cuts simultaneously and two roller back rests can be employed. With this tool shoulders only ¼ in. apart can be turned.

The pointing tool (3) illustrated is in distinction to the two former tools of the shank type for holding in the turret holes. The roller back rest jaws are independently adjustable and can be interchanged with those of the turning tools. In addition to mounting the pointing tool cutter, this tool is designed to carry a centering drill. A new design of adjustable hollow mill (4) has been brought out. This is intended for use on short work where a large amount of stock has to be removed quickly.

In addition to the bar tools described in the two preceding paragraphs a number of miscellaneous tool holders and adapters have been developed. These include a center drilling (5) and a knurling tool (6) and a floating type of holder (7) having a device by which any error of alignment between the hole in the work and the center of the turret is compensated for, thus preventing the reamer or other tool mounted in the holder from cutting too large.

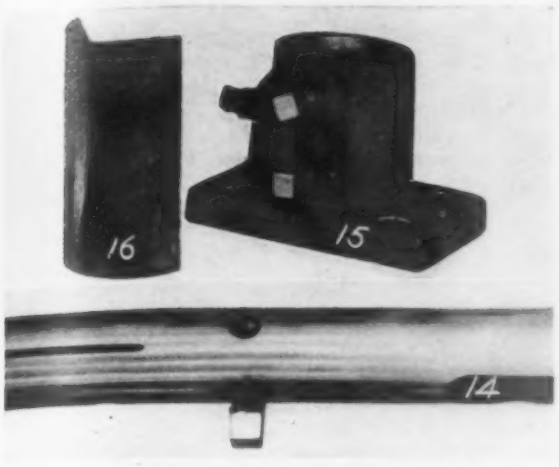


The Multiple Turning Head (10) for General Facing and Turning Work and Two of the Cutter Holders (12 and 13) and the Pilot Bar (11) Used with It



A Spring Die Adapter (8) and the Die Holder (9) It Is Designed to Fit

A spring die adapter (8) has been developed to fit the die holder (9) shown. Drill, tap, die and cutter holders of the standard type have been developed and are designed to fit interchangeably either any of the tool holders or the holes in the turret of the machine. In addition to the regular cut-off slide tool holders, such as are furnished on all standard screw machines, four holders have been developed. The two forming tool holders, one for the front and one for the rear of the machine, are of the dove-tail type and are split to enable the



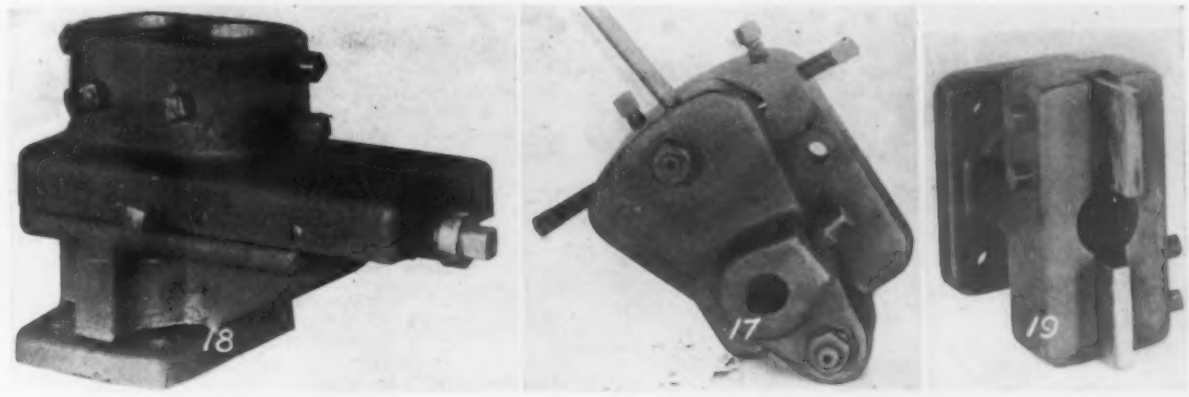
A Boring Bar (14), Holder (15) and Rocker Adapter (16) Making Up Another Combination

forming tool to be clamped to the holder by two screws at the side. Double holders to permit two cuts to be taken, or two shoulders to be necked simultaneously, are made, and are equipped with rocker wedges to adjust the height of the cutter point.

To enable chucking work to be handled, a number of tools have been developed for use with a three-jaw scroll chuck. These include the multiple-turning head (10), which is intended for a general run of turning and facing work and the pilot bar (11) shown, which is carried in the center hole and runs in a bushing held in the spindle and supporting the tool against chatter. The two cutter holders (12 and 13) illustrated were developed primarily for use in the turning head.

For simultaneously boring and turning, a boring bar (14) can be held in the center hole and brought into action at the same time as a cutter holder held in either of the other holes. The holder (15) illustrated is for adapting either of the tool holders or the boring bar to the turret. The rocker adapter (16) shown and the two set screws on the top of the holder enable a forged cutter to be adapted and readily adjusted for diameters.

For recessing and back facing, as well as boring in small quantities, a special tool (17) has been developed. The tool-carrying member swings on a pivot underneath the cutter, the motion being controlled by a handle. The two radial screws provide the required adjustment and also act as stops for gaging the depth of the cut. The slide tool (18) is intended for the same general character of work, but is more rigid and has a greater range. Among the work which it is designed to handle is the back facing of gear hubs and similar operations. The tool (19) is designed for facing work.



Recessing (17), Cut-Off Slide (18) and Boring (19) Tools

The Future of Zinc

A comprehensive paper on the spelter industry was presented before the British Institute of Metals by Ernest A. Smith at the autumn meeting in London in September. In treating the future of the industry in the United States, Germany, Belgium and other countries, he said in part:

"Before the war spelter reduction plants were in excess of the world's requirements, but the war had a most pronounced effect on the market because the greatest zinc-producing centers outside the United States are within the war zone in Europe. Very great efforts have been made in the United States to take advantage of the war conditions. In 1914 there were 33 zinc-smelting plants in that country, but through enlargements and the erection of new works the total capacity of the American plants will be brought up to about 650,000 tons annually, double the output of 1913, which amounted to 320,000 metric tons, or 32.1 per cent of the world's output.

"As to the spelter industry in Germany and Belgium, both those countries in the past relied largely on foreign ore supplies. Germany, however, has supplies of ore available in Silesia, Hungary, Carinthia and the Tyrol; but even if the mines are worked to their full capacity the supply will doubtless be insufficient to maintain the large output of spelter for which Germany has hitherto been responsible. The future of the Belgian industry is very uncertain, though no doubt the imports of foreign ores into Belgium will be renewed and every effort made to reach the former high production. For some time, however, the total production of Germany and Belgium will probably suffice only for home needs.

"Hitherto Great Britain has had to purchase spelter from other countries, and though there are abundant supplies of zinc ore within the British empire there has been inadequate smelting capacity for its treatment. But now that the Zinc Corporation and the British Broken Hill companies have been released from their contracts wtih the German groups, steps are being taken to erect the necessary smelting plants both in England and in Australia. Attention is also being directed to the possibility of developing the sources of zinc ore in the British Isles, which, with the application of modern methods of dressing, aided by adequate capital, may yet be profitably worked."

World's Output of Graphite

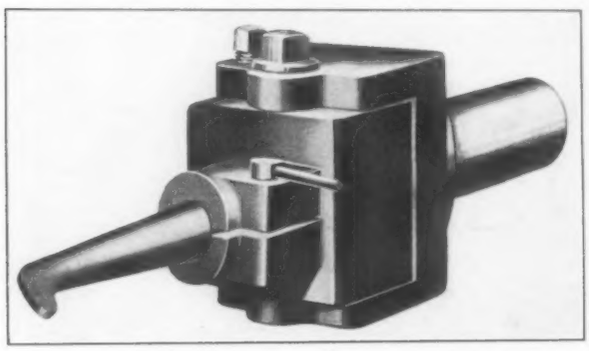
Interest in graphite at present is widespread. According to the Canadian Mining Institute *Bulletin* the two principal forms in which the mineral is found are amorphous and crystalline, the former being very common. The world's production statistics for 1912, the latest available, are as folows:

	Tons		Tons
Ceylon	36,660	Korea and Japan	8,363
Canada	2,060	Germany	13,814
South Africa	42	Italy	14,517
Austria	50,017	Sweden	87
Madagascar	5,011	Norway	285
United States	3,835	France	661
Mexico	3,158		
		Total	136,510

Forged Cutter Adjustable Boring Tool

An adjustable tool designed for general boring work done with a forged cutter has been placed on the market by the Pierce Machine Tool Company, 617 West Jackson Boulevard, Chicago, Ill. Rigidity and ready adjustment are emphasized, through the location of the cutting point on the correct center line when boring irrespective of any adjustment that may have been made for various sizes. Thus, it is pointed out, the frequent necessity of changing the cutting point to suit the adjustments made is eliminated.

The construction of the tool is apparent from the accompanying illustration. The clamping arrangement is positive and readily adjusted to the desired size. An accurate backing is provided by it for the swivel block, a feature which is relied upon to eliminate all tendency to chatter or vibration. The tool is shipped with the shank set in a central position, and if it is desired to bore holes having a larger diameter than the capacity of 1¼ in. the collar screw is loosened and the set screw, whose point seats on an incline, is adjusted slightly. This forces the adjustable swivel block outward and is relied upon to move the cutting tool to the desired



An Adjustable Boring Tool Employing a Forged Cutter

position. This arrangement and the use of a convenient lever enables the slightest adjustment to be obtained quickly without using wrenches.

As furnished regularly, a shank 1 in. in diameter is provided, together with a forged cutter that is not ground. Any desired shank can be supplied at a slight additional cost.

Electric Arc Furnace for Melting Brass

An electric arc furnace, claimed to be specially suited to melting alloys, such as brass, containing volatile metals such as zinc without excessive loss of the volatile metals has been brought out by Horace W. Gillett and James M. Lohr of Ithaca, N. Y., and U. S. Patent 1,201,224 was granted Oct. 10, 1916. In melting yellow brass in an indirect arc furnace, kept practically motionless, the losses are high. Experiments are cited showing that if there is a sufficiently rapid agitation of the charge the violent shooting out of zinc vapor does not take place. The new furnace comprises a shell with refractory-lined hearth of circular cross section, mechanically revolved on its horizontal axis, with adjustable electrodes, introduced through the ends and revolving with the body of the furnace. An opening into the body of the furnace serves as a charging door and pouring spout and is capable of closing tightly.

The Penn Mold & Mfg. Company, Canal Dover, Ohio, recently organized to build a plant for the manufacture of ingot molds, using hot metal from the Canal Dover blast furnace, has elected the following officers: C. E. Blue, president; H. S. Bradley, vice-president; H. S. Sands, treasurer; W. V. Holt, general manager. Its main office will be located at 47 Eleventh Street, Wheeling, W. Va. The plant will have a capacity of 400 tons a day. The company has placed a contract with the Austin Company, Cleveland, for its building; the Whiting Foundry Equipment Company, Harvey, Ill., for a 102-in. cupola; the Morgan Engineering Company, Alliance, Ohio, for a 25-ton electric crane, and the Case Crane & Engineering Company, Columbus, Ohio, for a 15-ton crane.

Pneumatic Scrap Reclaiming Press

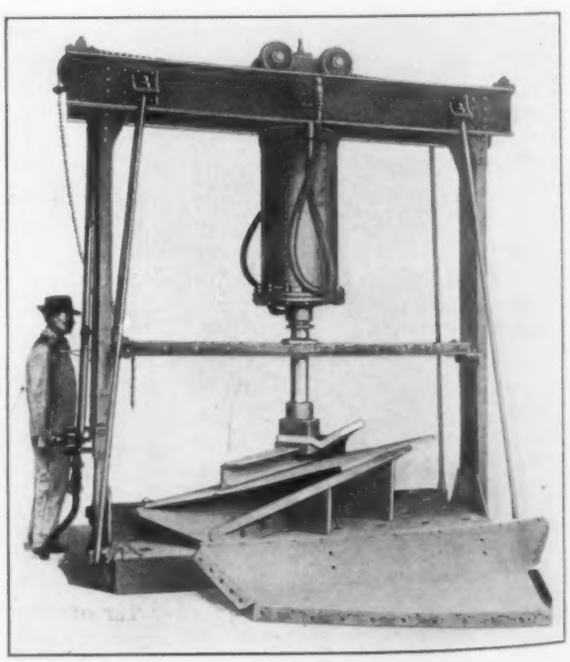
A press for reclaiming scrap material and building and repairing steel cars has been developed by the Southwark Foundry & Machine Company, Philadelphia, Pa. In addition to railroad work it can also be applied to general manufacturing and repair shop work where bent sheets, structural members, etc., have to be straightened or it is desired to form new material to particular shapes. Among the work for which it is particularly adapted are the straightening of bent truck frames, center and side sills, side sheets, channels, angles, truss rods, etc., and for forming new hopper sheets as illustrated, bending guard rails and other work required by the locomotive, car and maintenance of way departments of railroads. In doing the straightening work outlined special dies are provided to hold the material.

The base of the press is a heavy steel casting with a flat surface measuring 5 x 8 ft. and forming the foundation for the structural steel frame. This consists of two uprights supporting a main cross frame, the whole being braced by heavy tierods attached to the four corners of the base platen. The cross frame consists of two channel sections placed back to back with a space between them and serves as a track for the four-wheel carriage from which the pressure cylinder is suspended between the members of the cross frame. The carriage is propelled across the frame by an endless chain traveling over sprockets.

The travel of the ram is controlled by a specially balanced type of four-way valve located in a convenient position for the operator. The guide for the piston rod is held between two angle irons fastened to the vertical columns, which provides a clear space under the die of 36 in. The piston of the pressure cylinder is 20 in. in diameter and has a stroke of 36 in. Leather cup packing, which can be quickly renewed when necessary, is employed to pack the piston. A die, which can be changed in a manner similar to that of a steam hammer, is fitted to the end of the piston rod.

Air is supplied to the cylinder at a pressure of 100 lb. by a 1¼-in. flexible hose connection arranged to give free movement of the cylinder as it travels across the table. The capacity of the press at a 100-lb. air pressure is 15 tons.

Most of the work which the press is designed to handle can be bent or straightened cold, although in some cases it may be found necessary to apply heat. If cracking should occur as a result of cold bending, the cracks can be remedied and defective parts made sound by employing the oxy-acetylene torch or some other welding process.



A Pneumatic Press for Reclaiming Scrap Material and Repairing Steel Cars as Well as for New Work, Such as the Forming of Hopper Sheets for Steel Coal Cars, Which is Illustrated

HANDLING FORGINGS

The Part Played by Storage Battery Trucks in Two Cleveland Plants

The scarcity and high cost of labor has caused many manufacturers to turn their attention more than ever before to the reduction of manufacturing costs by cutting down the expense of handling material, this being particularly true of old plants not thoroughly modern in respect to their manufacturing and handling facilities. Recently the plant of the Columbian Hardware Company, Cleveland, Ohio, passed into the hands of new owners and one of the first steps taken by the management was to make it more efficient by the rearrangement of machinery and by the installation of improved handling equipment. This company operates a forge shop and makes, among other products, forged steel vises, drop forgings for automobiles, anvils and stamped registers for warm air heating systems. Hand labor for moving material and finished products has been supplanted largely by the use of an electric storage battery truck, which has given very satisfactory results. This is said to be one of the first forge shops to make use of an electric truck.

Raw material is taken on the truck from the stockyard outside of the plant to the shearing machine in the forge shop. When the stock, after successive operations, becomes finished product in the final assembly and finished stockroom the truck is again brought into use for conveying the products to the shipping room. It is also used for carrying the forgings and other products from the shipping room to the shipping platform, running up an incline to reach this platform, which is on the car floor level. Some of the time the truck, with its load, is run directly into the cars. Formerly with hand-propelled trucks it took four men 7½ hr. to load a car. Now it is stated that with the electric truck this work is done by two men in 3 hr.

For convenience in operating the truck, a 4-ft. cement walk has been laid extending from the outside stock storage yard through the forge shop, which has a dirt floor. The illustration shows the truck loaded with vise forgings that are placed on a rack equipped with casters. The rack provided at present is heavier than needed, and because of its weight the men prefer to handle the material by placing it directly on the truck platform. The same truck is also found to be very convenient to use as a tractor in hauling four-wheel wooden box shop trucks around the plant loaded with various materials in process of manufacture. When used as a tractor a chain is slung around as many hand trucks as are to be hauled and the ends are hooked to the tractor.

The electric truck used is of 2 tons capacity and has an elevating platform, making it adaptable for use in hauling loaded racks. It is higher than the standard type to provide greater clearance and easier running over a rough surface. It has 4 x 22-in. driving wheels and 3½ x 15-in. rear wheels with solid rubber tires. The platform is 3 x 5 ft., the wheelbase 53 in., and the turning radius of the outside wheels 7 ft. The height of the platform lowered is 17 in. A truck with a high platform is not considered objectionable for handling forgings, because with a capacity load the material will not reach a height that would add to the manual labor of placing it on the platform. It has three speeds in either direction, its maximum loaded being 5 to 6 miles per hour, and is equipped with Edison batteries of 1040-watt capacity.

Another forge shop that has recently placed an electric truck in use for handling stock, finished automobile and other forgings and for a variety of other similar purposes is that of the Cleveland City Forge & Iron Company, Cleveland. This company uses a 2-ton truck with 3½ x 20-in. wheels on both the front and rear axles. It has a 37 x 75-in. stationary loading platform 24 in. high, the batteries being located under the platform. Both types of trucks were built by the Elwell-Parker Electric Company, Cleveland, Ohio.

A Carload of Forged Vise Parts Is Loaded by Two Men in 3 Hr., Using a Rack Provided with Casters and Taken Away When Filled by a Storage Battery Elevating Shop Truck at a Speed of 5 or 6 Miles as Compared with 7½ Hr. for Four Men Using Hand Trucks

Quick Method of Breaking Steel Bars

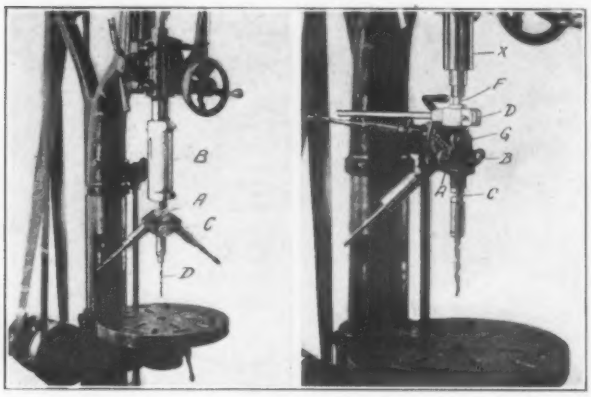
A physico-mechanical process for breaking steel bars of any cross section without waste of metal has been originated by a Frenchman, P. V. L. Bellanger, of Paris, France, and patented in the United States (U. S. 1,201,137—Oct. 10, 1916). At a point in the length of the bar where it is to be broken, the bar is submitted to the very slight and quick action of a blow-pipe, the flame of which may be oxidizing. The action of the flame produces a physico-chemical change modifying the properties, so that the metal becomes brittle at that point in an extremely small zone. The blow-pipe flame should have the shape of a lance head and be applied normal to the length of the bar so that only the point acts on the metal. It is claimed that the molecules of the metal lose their elasticity so that the bar can be broken cleanly without the metal being harmed. The temperature to which the metal is subjected is about 700 deg. C. The bar is placed on two supports and a hard cutter is applied by pressure or blow opposite to the affected portion of the bar, producing a clean break and an absolutely flat section without tearing or wasting the metal.

The St. Louis Safety Council, which has been formed in the St. Louis industrial district, will survey and organize the city and industrial district. Safety round table conferences have been established in five subdistricts in the city and one on the east side of the Mississippi River composed of superintendents and foremen of large industrial plants.

The Magnesite Refractories Company, Portersville, Cal., recently incorporated with a capitalization of $200,000, proposes to build one of the largest magnesite manufacturing plants in the country, reducing crude magnesite for shipment to the East, and manufacturing refractory brick and plastic materials.

Vertical Drilling Turret Attachment

A new style vertical drilling machine turret attachment has been developed by Charles Eisler, 43 Dodd Street, Bloomfield, N. J. In a general way it resembles the lathe turret attachment, which was illustrated in THE IRON AGE, March 16, 1916, and is designed for the manufacture of interchangeable parts in large



The Different Tools Required in the Production of Interchangeable Parts in Large Quantities Are Mounted in Either of These Two Turret Attachments for Vertical Drilling Machines and Brought Into Use as Needed

quantities where a number of different operations have to be performed. The special features of the attachment are that the tools can be readily changed without requiring the operator to leave his working position and when in use the tools are in line with the center of the spindle and consequently receive full pressure, which is relied upon to give better work. The attachment is made in several sizes to handle from two to five tools and in two styles, one with and the other without an automatic stop.

When it is desired to change the tool in use with the plain attachment shown at the left of the accompanying illustration, the knob *A* is pulled out of the hole *B* and the substitution made. The knob is then released and the plunger connected with it enters the corresponding hole and locates the drill in line with the spindle center. The shank *C* of the attachment can be supplied with a taper to fit any standard chuck, or if desired shanks for special chucks can be provided. The stop rod *D* is relied upon to prevent the body of the attachment from rotating. The taper shank *F* drives the turret in the customary way, the body of the attachment pivoting on the pin *G*. When the main spindle of the machine *X* is raised the spindle that is in use *C* stops immediately.

In the attachment provided with the automatic stop, which is shown at the right, when the knob *A* is pulled the drill that is in use *D* stops immediately without raising the spindle of the drilling machine. A sleeve attachment to the spindle *B* is provided for use where the tool is kept at work more or less steadily and can be made for several sizes of drilling machines. This attachment is made for taper-shank drills and it is pointed out that in no case is it necessary to stop the machine when the position of the tool is changed, only 1 sec. being required. A drift hole *C* is shown in one of the shanks.

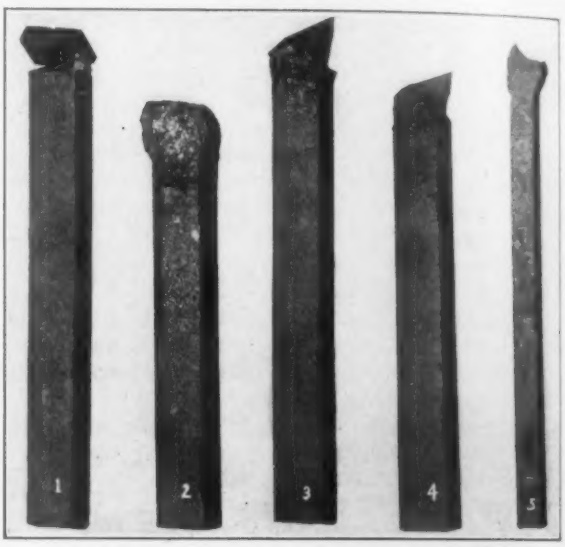
Refractories of Zirconium Oxide

The manufacture of refractory shapes made from zirconium dioxide and thorium dioxide or both is the subject of a German patent (287,554 Nov. 29, 1913), according to *Chemical Abstracts*. The mixture is subjected to high chemical pressure. After relieving the pressure the product is finely ground and stirred up with water or an alkaline solution, after which the liquid mass is poured into the desired forms, dried and burned. The molded article is stated to be readily removable from the form, showing no cracks either on drying or burning. Vessels made of this material are claimed to be tight and sufficiently strong to resist fracture when thrown upon a hard floor.

Cutting Tools Made by Electric Welding

At the present time the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., is using a number of welded cutting tools in its planing machines and lathes. They were made by welding high-speed steel tips to shanks of machinery steel by means of the arc welding process. This process has been found cheaper than either oxy-acetylene welding or forging and enables wornout high-speed tools to be cut to tips of the proper size, thus effecting a considerable saving. In the accompanying illustration the successive stages in the production of the tools are presented from left to right.

The high-speed tip is first tacked to the machinery steel shank as shown at *1*. After applying borax as a flux, the welding is begun and when this is completed the tool is laid in mica dust to cool gradually. At this stage of the process the tool has assumed the shape



Successive Stages in the Welding of High-Speed Steel Tips to Machinery Steel Shanks with an Electric Arc Machine from the Preliminary "Tacking" of the Tip to the Shank to a Finished Tool Which Broke Outside of the Weld While Being Subjected to a Hammering Test

illustrated at *2*. The tool is then given an initial grinding as shown at *3*, after which it is tempered and the grinding operation completed. This makes the tool ready for use and one in this condition is illustrated at *4*. The tool at the extreme right marked *5* is one whicl. was hammered to test the strength of the weld, and, as will be noticed, while it broke the fracture was above the weld.

The machinery steel shank used may be of either hot or cold-rolled or carbon steel and of any desired length, while the steel tip should be short. The metal of the shank, which is relied upon to reinforce the tip, is built out and around the latter. In this way, it is explained, a larger radiating surface is provided, as well as a conducting path of greater area back to the butt of the tool, which keeps down the temperature at the cutting end. An ordinary Westinghouse electric arc welding equipment, such as is employed for the welding or repair of castings, is used, a Norway iron electrode 5/32 in. in diameter being utilized. To secure the best results a current of approximately 100 amp. is recommended and a voltage of from 60 to 70 volts. The work, it is stated, should not be hurried, although a good operator should be able to weld from 25 to 30 tools having a cross-section of 1½ sq. in. in a 9½-hr. day.

Helen furnace of the Red River Iron Works, Clarksville, Tenn., was blown in Nov. 3 and will produce ferrosilicon as heretofore. The furnace was blown out Sept. 25 for repairs.

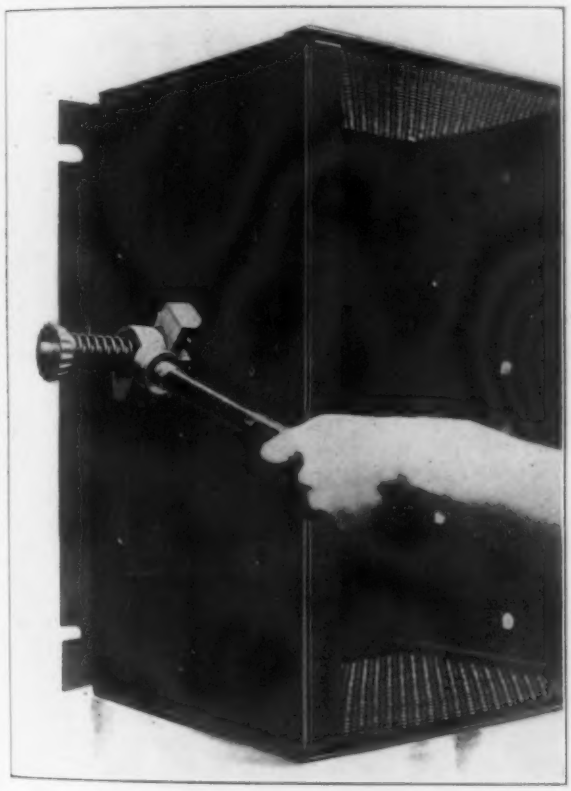
The Lackawanna Steel Company made the first steel in its new No. 23 open-hearth furnace last week. The company recently started its new No. 11 rolling mill.

Handy Cutting Tool for Sheet Metal

To enable additional holes to be made in the metal surrounding an electric light panel box to accommodate pieces of conduit or for similar work in the sides of metal lockers, the Universal Tool & Appliance Company, Stroh Industrial Building, Milwaukee, Wis., is marketing a cutting tool. The device, upon which a patent has been applied for, can be used for cutting all sorts of metal, fiber and slate, and can also be adjusted easily and quickly for various sizes of holes. It possesses the advantage of course that it can be taken to the work rather than having to bring the work to the tool.

When it is desired to use the tool a pilot hole is drilled through the material and the stud of the tool inserted. A flange nut is then secured on the opposite end of the stud and a ratchet wrench applied, as shown, a few operations being all that is required to cut the hole. The knives can be adjusted for cutting several diameters of holes and are held in a swing chuck. The spring shown between the chuck and the sham nut automatically feeds the knives.

In a test recently made of the cutter, the wall of a standard conduit cut-out box, which was approximately 0.1 in. thick, was cut in less than 1 min., 14 revolutions of the knives being required. The tool can also be used



To Cut Holes in Sheet Metal, Fiber or Slate with This Tool a Pilot Hole Is Drilled, the Stud Passed Through and Secured by a Flange Nut on the Opposite Side and a Few Turns Given with a Ratchet Wrench

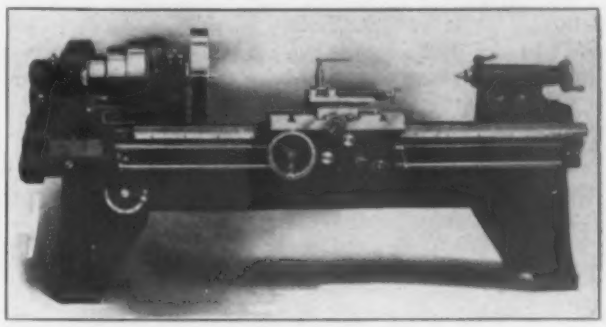
for tanks and similar work where the flange nut cannot be secured to the stud on the inside. The only change necessary in this case is to tap the pilot hole after it has been drilled and screw the stud in.

Patching Concrete Factory Floors

An article entitled "Patching Concrete Factory Floors" was published in THE IRON AGE of Aug. 10. It appears that the use of a mixture of asbestos fiber and rubber gum is not applicable to the repair of deep holes in factory floors or large areas, although such an inference might have been taken from the article. Such patches are quickly made and give excellent results, it is stated, when confined to patches about ⅛ in. thick and where truck loads do not exceed 1½ tons, but when used on deep holes or large areas they will not give the satisfactory service.

A 20-In. Quick Change Geared Lathe

The Walcott Lathe Company, Jackson, Mich., has placed on the market a 20-in. lathe with quick change gear box. Among the features of the lathe are a special arrangement of gear protection, a double-wall type



The Lower Portion of the Gear Guard of This 20-In. Lathe Is Cast Integral with the Headstock and a Special Quick Change Gear Box Provides 32 Thread Changes Controlled by Two Levers

of apron with all steel gears, a wide carriage bridge, an improved form of quick change gear mechanism and large bearing surfaces on the bed.

High-carbon steel finished by grinding is used for the headstock spindle which is mounted in bronze journals having provision for taking up wear. A long pilot for truing up the face plate independently of the thread is provided for the spindle nose. The lower half of the gear guard is cast solid with the headstock and the gear guards proper are bolted in place and cover the gears. The ratios of the back gears are 3.17 to 1 and 10 to 1.

The saddle is of heavy and stiff construction, the carriage bridge being very wide and deep. Further reinforcement for the bridge is provided by having a bearing on the front tailstock way, an arrangement which is relied upon to eliminate all springing under the pressure of the cut. The bearing of the saddle on the V's is 27 in., which, it is explained, tends to increase the wearing quality. The apron is of the double-wall type and the gears are steel drop forgings with wide faces and coarse pitch. The longitudinal and cross feeds are operated by friction and are reversible in the apron. The feed shifter and the lead screw nut are interlocked to prevent the engagement of rod and screw feeds at the same time.

The quick change gear box provides for 32 threads ranging from 2 to 112 per inch including the standard 11½ thread for pipes. Two levers on the front of the machine regulate the changing of the feed and by changing one gear at the end of the lathe it is possible to cut special or very fine or coarse threads. The tumbler gears and cone are used only for thread cutting. This, it is emphasized, simplifies the design of the gear box.

The lathe is regularly furnished with an 8-ft. bed which gives a distance between centers of 54 in. It is belt driven from a double-friction overhead countershaft. The diameter of the largest step of the cone pulley is 12 in. and the width of all the steps is 3 9/16 in.

Protecting Gas Ports of Open-Hearth Furnaces

In order to overcome the rapid deterioration of the gas nozzles of open-hearth furnaces, caused by the action of the intensely hot outflowing gases, rendering the furnace unfit for use until repaired, James W. Barnes, Youngstown, Ohio, has provided a mechanism (U. S. patent 1,186,370) whereby communication between each gas nozzle and its gas chamber is cut off at the outflow end of the furnace so that the hot products of combustion will pass from the furnace solely through the air outlets. An arrangement of ports and valves is also provided by means of which the gas nozzle at the supply end will be placed in communication with its gas chamber simultaneously with the cutting off of communication between the other gas nozzle and its gas chamber.

Book Reviews

Predetermination of True Costs. By Frederic A. Parkhurst. Pages, viii + 96, 6 x 9 in.; illustrations, 30. Published by John Wiley & Sons, Inc., New York. Price, $1.25.

Mr. Parkhurst offers his book as an argument on the possibilities of predetermining true costs and explains in the preface that the contents are conclusions reached after years of actual trial under scientific management. Consequently, at the outset, we must accept this treatise as having proved practicable under his direction. Whether or not a business man would have the courage to study and apply the method to his own plant is another question. Certainly it promises to be too heavy and minute for a small enterprise. The book is not written for the layman; it is detailed but not apparent, the process requiring a clearer routing.

On the other hand, "Predetermination of True Costs" is worked out with great care and offers many valuable suggestions. It points out authoritatively that most systems lack a proper distribution of charges and are insufficiently itemized. Where there is little system, there is much guesswork; and in his attempt to present a method for determining the cost in advance and daily, the author has left no item to speculation.

Having determined the direct and indirect costs of production, together designated "true costs," and having added to them the profit figured on the bases of productive-hour, pound, piece, per cent of cost and mutual satisfaction, we have as the result the "relatively true," or approximate, selling price.

All elements of the operations are known beforehand, standardized and timed so that a man-hour basis may be used even in the foundry. The reader is convinced after reviewing the chapter on the erroneous methods of distributing indirect expense, that the percentage, flat-hour and straight pound rates are inadequate for foundry use and is eager to have the author prove that the differential process rate method, by which the expense of operation is distributed in proportion to the operating cost of equipment—per machine—is practicable. This the author has accomplished in the plant under his own supervision.

In the chapter on mutual satisfaction Mr. Parkhurst discusses the morality of profits and urges that a profit based on costs and not on competition is a legitimate profit and is readily agreed to by the customer. That high salaries and a bonus will improve workmanship and insure a maximum output are the author's conclusions in his study of the good-will of labor.

Complete process forms leading to the final estimate sheet illustrate the edition.

Homans's First Principles of Electricity. By J. E. Homans. Pages, viii + 248, 4¾ x 7½ in.; numerous illustrations. Published by Sully & Kleinteich, 373 Fourth Avenue, New York City. Price $1.

The author starts with the assumption that the reader, even though he may not be familiar with the science of electricity, desires the information that should be found in a book of this nature. An effort has, therefore, been made to cover the principles of the science from the ground up. The book is divided into 24 chapters. Besides basic information the subjects covered include primary and secondary batteries, induction, magnetism, motors and generators of various kinds and magnetic coils and transformers. An appendix contains a number of useful formulas and tables.

Automobile Welding with the Oxy-Acetylene Flame. By M. Keith Dunham. Pages, 167, 4 x 6¼ in.; illustrations, 66. Published by the Norman W. Henley Publishing Company, 132 Nassau Street, New York City. Price, $1.

The book explains the use and care of apparatus in the repairing of automobiles by welding and gives directions for the construction of the necessary shop equipment. The actual welding of all automobile parts of aluminum, cast iron, steel, copper, brass, bronze and malleable iron is treated in a non-technical way and instructions are given on the burning of carbon out of the combustion head. The uses of oxygen and acetylene for lead burning, soldering, case hardening and heating are touched upon, while the final chapter gives instructions on how to figure the cost of making various welds.

The Engineer in War. By P. S. Pond. Pages, xv + 187; 5 x 7½ in.; illustrations, 69. Published by the McGraw-Hill Book Company, New York. Price, $1.50.

This book gives a brief outline of the relation of engineering to the conduct of war and the adaptation of the principles and practices of civil engineering to military requirements. The book is not intended as a text book for civilian engineers who wish to acquaint themselves with military engineering, but is written solely for the purpose of acquainting them with the scope of their duties in the event of war. The 11 chapters cover in a general way the military policy of the United States, the duties of the military engineer and the economies of military engineering, the tools and equipment of military engineering, stream crossings, military roads, military sanitation, field fortification and siege operations, military demolitions, military reconnaissance, sketching and surveying and the mobilization of material resources.

The book is extremely interesting and is a severe indictment of the happy-go-lucky military policy of the United States in that it shows clearly the vast amount of training that civilian engineers would require before they would be of any value to the country from a military standpoint in the event of hostilities.

Hendricks's Commercial Register of the United States. Pages, 1738, 7½ x 10 in. Published by the S. E. Hendricks Company, Inc., 2 West Thirteenth Street, New York City. Price, $10.

The twenty-fifth edition of this book is distinguished by the publication of a list of trade names, brands, etc., apart from the main portion of the register. This list, which covers 202 pages, furnishes a reference for purchasing agents and prospective buyers to any products which have distinctive names. At the same time the trade names which formerly appeared in parentheses after the manufacturer's name under the different classifications are retained.

The main portion of the work is a comprehensive register of producers, manufacturers, dealers and consumers of the products used by the iron and steel, mechanical, hardware, engineering, railroad, architectural, electrical, quarrying, contracting and kindred industries. There are some 45,000 classifications, containing approximately 350,000 names and addresses.

The Cincinnati Milling Machine Company, Cincinnati, Ohio, has issued a 409-page book of standard 6 x 9-in. size, treating of milling machines and the work they do. The book is a compilation of the results of the experimental work that has been carried on by the company in cutter design, cutter and work cooling and other branches of the art and also includes some matter that has not been published in the technical journals. Computations involved in cutting spur, bevel, spiral and worm gears present these subjects in a simple detailed manner and a number of tables and formulas are included. Four chapters are devoted to the construction, use, erection, care and adjustment of the machine, followed by an analysis of the process of milling and data on feeds and speeds, lubrication, design and the sharpening of cutters and the power required to do milling. One chapter relates to milling jigs and fixtures. The cutting of various gears and the calculations involved are covered. The price of the book is put at $1.50.

Plans for the development of a water and industrial terminal at Bayonne, N. J., were filed recently with the Board of Commissioners of that city by the New Jersey State Board of Commerce and Navigation. These plans have resulted from conferences between the Bayonne Chamber of Commerce, the City Commissioners of Bayonne, the State Board of Commerce and Navigation and Irving T. Bush, president of the Bush Terminal Company. Should these plans be put into execution, over $7,000,000 will be expended in this development.

Perpetual Inventory and Appraisal Values

How Values Increased Through Extraneous Conditions Lull Manufacturer Into Wrong Sense of Financial Security — Table of Standard Depreciation Rates

BY CHARLES PIEZ*

"WHAT is your plant worth? You should know—exactly. You should know for insurance purposes, for financial purposes, for every purpose that has anything to do with the safe conduct of your business. You should know—must know—before you can calculate costs, overhead, profits; before you issue securities, make loans, place insurance. Your annual statement has a hollow foundation if its estimate of your assets as a going concern is based on the accountant's guess—a guess that has no better foundation than an estimate of costs at some past period from which certain arbitrary percentages have been written off each year."

This statement, taken from a publication of one of the appraisal companies, can be accepted as sound, without committing ourselves to the conclusion which the appraisal company is anxious to establish that the real worth of a plant for all purposes can be established only through the work of professional appraisers.

Most plants grow from small beginnings, and during their early life expand as the needs dictate. The organization is necessarily small, because the most rigid kind of economy must be practised, and original costs and the costs of additions are frequently so completely submerged in the total assets that no safe records of these costs can be established. Many plants never outgrow this lump-sum treatment of assets. In these cases depreciation of plant and equipment is either wholly disregarded, or else an arbitrary amount is charged against profits, the amount of depreciation varying inversely as the size of the profit it is desired to show. The annual statements of plants so conducted have indeed a hollow foundation, for not only their assets, but usually their profits are based on the accountants' guesses.

Industries so managed need the assistance of a competent appraisal company to inform them of the value of their assets, as a basis for embarking on a sounder and safer system of accounting methods. Practically all successful industries, after their early years of rule-of-thumb accounting, start with an appraisal, and then so maintain their inventories that additions to the plant are accurately recorded, and depreciation is based on judgment and experience. But even such industries will find it to their advantage to ask the aid of appraisal companies for the purpose of determining authoritative records of the cost of reproducing plant and equipment, so that under-insurance or over-insurance may be avoided, and the basis for the requirements of co-insurance complied with.

Appraisals are also valuable in establishing comparative values of plants that are about to merge, or in serving as a basis of a scheme of financing. But the claims that an appraisal is necessary for figuring overhead costs and the selling price and profit of manufactured articles, is, to say the least, sadly overdrawn.

HOW APPRAISALS ARE OFTEN INFLATED

It has been my experience that in well managed industries appraisal values are usually considerably above sound inventory values established by the management. With the steady advance in prices that has been going on almost continually for the last twenty-five years, it is but reasonable to suppose that replacement values are substantially higher than initial costs, and it is well to establish the amount of such excess if a proper insurance coverage be desired, but such advance is wholly speculative and has absolutely no bearing on the value of the plant from the standpoint of the operating and sales management.

The establishment of true costs is an essential element in the success of the business, and true costs can only be obtained when every item of expense is included. Buildings that were adequate in size and convenience of arrangement when they were first erected gradually out-grow these initial advantages as the business increases, and in spite of substantial increases shown in the appraisal value of the buildings, they have less value for the purposes to which they were put than they had when they were first constructed. They may, in fact, prove so unsuitable to the increasing needs of the business as to justify demolition and reconstruction.

Few owners are astute enough to foresee their needs for ten years to come, and fewer still have the means to build or expand along the lines that will give ample opportunity for future business growth. It is safer by far, therefore, to provide proper sinking funds through an ample rate of depreciation, so that when buildings that have outlived their usefulness require reconstruction, funds have been provided out of profits for rebuilding along more modern lines.

Machine tools have changed very considerably as a result of the development of the Taylor-White and other high speed steels, and companies that followed appraisal methods of depreciation, find themselves with obsolete equipment and no funds to replace it with modern equipment.

Patterns and small tool equipment often have but temporary value and should disappear wholly from the inventory when they have served their purpose, yet these two items are fertile sources for inflation of values through appraisals.

CHARGING DEPRECIATION AGAINST OPERATING EXPENSE

What the management of an industry is chiefly concerned in is to provide a fund through a proper scale of depreciation which will reimburse it for the difference between the cost price of a piece of equipment and the fair cash selling price of that piece of equipment when it is sold, either because it is ready for the scrap heap, or because some newer form or method has made a change desirable. This difference is properly a part of the cost of the product, but becomes so only by charging depreciation against the expenses of operation.

Has any appraisal company ever investigated the subject of depreciation from the operating standpoint and recommended a schedule of depreciation

(*Continued on page* 1266)

*President Link-Belt Company, Chicago. The article is a paper to be read before the December meeting of the American Society of Mechanical Engineers.

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Shortage of Pig Iron

A year ago the attention of our readers was called to the fact that the blast-furnace capacity of the country was not keeping pace with the increase in the capacity of steel works. This assertion was confirmed and emphasized by the summary of new construction printed in THE IRON AGE of January 6, which showed that new open-hearth furnaces then under way represented an annual capacity of 4,265,000 tons of steel ingots, while the new blast furnaces then being built had a capacity of only 1,750,000 tons of pig iron. In THE IRON AGE of January 13 the statement was editorially made that "the balance between pig iron and steel was a delicate one" and that "it now seems by no means improbable that pig iron will undergo an adjustment that will materially lessen the spread between it and unfinished steel."

New open-hearth furnaces steadily came into commission as the year advanced, and the price of steel persistently moved up as the demand was still seen to be in excess of the output, but much to the surprise of blast-furnace owners the supply of pig iron seemed to adjust itself to the increasing requirements of the open-hearth steel makers and the price of basic pig iron showed little variation from month to month. In July announcement was made that the Bethlehem Steel Company's new construction program would involve a total of 12 blast furnaces and that 14 furnaces were to be built by a number of other companies, which with two new furnaces blown in about a month before would eventually give an addition of 4,500,000 tons to our annual blast-furnace capacity. It was pointed out, however, that only a small part of this increase in capacity will be available this year.

These figures are mentioned to indicate that the situation which is now on us was long ago clearly indicated. In the past month or six weeks a scramble for pig iron has taken place. It is true that this was aggravated by the heavy purchases of steel-making pig iron for export, but it appears quite probable that the shortage would have developed even without these export sales, which perhaps simply caused consumers of pig iron to make preparations to cover their requirements for the future. The market report issued by the Matthew Addy Company, Cincinnati, under date of November 25 quite forcibly covers the current situation. It is in part as follows:

> We have had this month the most sensational sudden advances in price that iron has ever known, yet efforts to check the buying of iron seem only to encourage it the more. The most remarkable thing about the present market is the fact that nearly everything that is being sold is for delivery over the last half of next year. Ordinarily pig iron is bought for delivery six to seven months ahead. That is, at the present time iron usually is selling for delivery over the first half of the year. Now, however, tremendous sales are being made for the last six months of 1917. There is a positive shortage of basic and Bessemer steel-making irons. It seems evident that the capacity of the country to make steel has developed more rapidly than the capacity of the country to make iron for the manufacture of steel. And so many furnaces that usually run on foundry iron are being turned over to the making of steel iron that the foundry trade is all upset. This week sales have been on a tremendous scale. Probably November, 1916, will go into history as the largest selling month in the history of the trade. . . . Prices to-day are irregular, depending on the views of the seller. But there are no low prices.

Never before has the country seen such a situation as is here presented. We have had excited times when buyers of iron and steel have taken alarm and have covered their requirements a considerable distance ahead, but never before has a covering movement extended so far into the future. The conditions of the past year or more have been such as to check prophecy, the developments of the trade having completely broken precedents. The conservative naturally shake their heads and counsel caution because the heavy demand for steel products is based on war conditions. But no man can say when the European war will cease. Should it continue for another 12 months the prices now prevailing may seem quite moderate.

Readjustments After the War

The question as to what readjustments in trade will occur after the war has, of course, a very practical bearing for business men, since success consists largely in anticipation. The matter of wages has been brought to the front again by the fact that the iron and steel industry is making another general advance in wages, the Steel Corporation having stated that its advance is to become effective Dec. 15. The iron and steel industry has now made three general wage increases this year. The first, which became effective Feb. 1, was regarded as an ordinary one. The second, effective May 1, was regarded as directly connected with the war, and many

steel manufacturers endeavored to instill the idea that it would automatically come off at the close of the war. In connection with the last advance little reference is made to this idea, it being recognized that the cost of living and various other important factors will enter. In other words, all thought of the war being followed by the *status quo ante* is being abandoned. As the appraisement of things progresses the conception is more along the line of developments at the end of the war being "changes" rather than "readjustments."

So far as wage rates may be dependent upon the cost of living there is ground for expecting reductions. The chief causes in the great advance in the cost of living are the natural advances in commodity prices due to foreign buyers making high bids for our goods, thus establishing high market values and in some instances at least causing more or less of a scarcity, and the advances sellers find they can make with ease, because money is plentiful and the public is not very critical when it is prosperous. There is no indication that the high cost of living is due in any large part to increased cost abroad of the goods we import. Every one knows that our imports, reported in dollars of value, are beyond all records, but there is no definite ground for attributing the increase chiefly to higher unit prices. In the case of our exports it is well recognized that values per unit have greatly risen, that our extremely heavy exports are not in the main due to the quantities exported being larger. There is a distinct difference between our import trade and our export trade in this respect. While a complete analysis is quite impossible, some representative imported articles, the quantity of which is given in the import statistics, have been selected at random for the comparison. The representative period before the war, to be compared with the first nine months of this year, is the first nine months of 1913, in which period imports made a new high record. The increase is 39 per cent, from $1,327,385,071 to $1,831,174,668. Representative commodities imported by quantity make the following comparison:

Small decreases—Asphalt, matting, oil cloth.

Large decreases—Cattle, macaroni, carbolic acid, lead, paper stock.

Small increases—Antimony ore, asbestos, rice, bristles, grass seed, raw silk, spirits, lumber.

Large increases—Aluminum, brass scrap, nickel ore, paper, spices, raw wool.

If it were possible to make a complete inventory it would probably be found that the increased unit cost of imports is practically negligible. Nor can it be seen from the data available that we have turned largely to the importation of luxuries. Rather we are importing more raw materials for manufacturing. One important exception is in paper, as we have imported a great deal more paper, but much less of the raw material for making paper.

The end of the war will be likely to occasion, therefore, no great change in our imports, except for the very important possibility of there being large imports of such goods as we can manufacture, but which foreign manufacturers may be willing to sell at much lower prices than our own manufacturers are getting into the habit of charging. Thus there is no reason to expect any material decrease in the total value of our imports, while there may be a tendency for them to increase. To maintain our position it will be necessary for us to have large exports. Of the present export trade little will remain. Much of it is in supplies directly intended for the war, while much lies in the high value placed upon goods exported to neutral countries. If an exact inventory could be made of the quantities of goods exported to neutral countries at present, in the regular course of trade, the total would undoubtedly be pitifully small, compared either with the quantities exported before the war, or the values now assigned to total exports, about half a billion dollars a month.

In American industries the introduction of labor-saving machinery has been continuous. Sometimes the pressure has increased and sometimes it has decreased, but the tendency has always been present. The tendency is great at present, but the expression of it is limited by the difficulty in buying machinery. After the war the limitation will be removed, but the tendency will continue and with most manufacturers the funds will be ready. Under the stress of heavy demand for their products, coupled with scarcity of labor and inefficient performance of the men it is possible to hire, manufacturers in all lines have been making up their minds to push the elimination of hand labor as far as they can year by year. There will be no relaxation of this desire.

The New Ore Prices

Prices of Lake Superior iron ore for 1917 have been established by sales at the highest figures considered in any recent discussion of the matter. The advance of $1.50 a ton over the year's prices is about 50 per cent more than the maximum talked of only two or three months ago. It is only one sign of the times that after sentiment in the ore trade had practically settled upon $1.30 as the extent of the advance, the developments of a single day should have turned the scale in favor of an amount 20 cents higher. The announcement of another general advance of 10 per cent in wages was made by the leading steel companies on Wednesday, Nov. 22, carrying with it a 10 per cent advance in wages of iron miners, and by late afternoon of that day important iron ore interests let it be known that $1.50 rather than $1.30 would represent the step between the furnacemen's iron ore costs of 1916 and 1917.

It need hardly be said that the unparalleled performance of the pig-iron market in the past six weeks could not have been better timed to resolve any doubts the ore producers may have had as to the size of their share in the astounding rush of prosperity in iron and steel. With pig-iron buyers eager to cover for their needs through all of next year at advances amounting to $6 to $8 in a single month, and with vesselmen able to get a 100 per cent advance for 1917 over the 1916 level for ore charters, there was nothing to suggest moderation to the iron ore producer. Accordingly we have in the case of old range Bessemer ore at $5.95 for the base a figure only exceeded by the $6 price of 1887 and 1890, and in old range non-Bessemer at $5.20 an advance of 20 cents over the high level of $5 in 1887, while Mesaba Bessemer at $5.70 is prac-

tically $1 a ton higher than the previous high point of $4.75 for 1907 and 1910, and Mesaba non-Bessemer at $5.05 compares with a previous high of $4 in 1900, 1907 and 1910.

In commenting just twelve months ago on the prices then about to be named for Lake Superior ores for this year, it was said in these columns that "the iron ore producers seem likely to repeat the recent experience of steel makers in having their prices made for them by conditions little within their control." And it was added:

> Admittedly there is no parallel for the present situation. Certainly there is a general disposition in the iron trade to believe that considerable advances in pig iron and steel products are yet to be seen, and no indications of an early ending of the war or of the prosperity of iron and steel manufacturers are in sight.

With the remarkable advances pig-iron and steel products, especially the latter, have had in the year since the above was written, the amazing fact is that it may now be taken over word for word as applicable to the situation to-day. The ore men, after deciding late in 1915 on an advance of only 70 cents for this year, though $1 had been proposed in some quarters, are now, with the ending of the war and of war prosperity twelve months nearer, naming prices that seem to suggest compensation for their moderation of a year ago. It certainly cannot be said that they are out of line with present profits on pig iron and steel. What the fact will be 18 or 20 months hence—when $5.95 ore will still be going into the furnaces—as to the relation between ore costs and the pig-iron market, only the war tide of 1917 can determine.

CORRESPONDENCE

Some Causes of Labor Shortage

To the Editor: The editorial on the shortage of labor supply in THE IRON AGE of Oct. 26 stated that "this is not because we are actually short of men . . . but it is because our industrial expansion is proceeding at a greater rate than our human labor supply increases." This is indisputable. At the same time, however, our visible labor supply is not contributing its full quota toward the amelioration of the abnormal conditions which prevail.

There are three types which constitute a drag upon the accomplishment of this industrial expansion. One is composed of those who have been prevailed upon to strike and, irrespective of the merits of the various controversies and the loss of wages to themselves, have caused loss of valuable time to the investor. This time can never be made up and therefore affects adversely the local community and by reason of the multiplicity of these cessations of productivity, the nation at large. Another takes in those who are habitually moving from one job to another; there are also those who cannot stand prosperity and must take a certain number of days off each week. Both these classes cause a loss of time, with the same effect as set forth above. Furthermore, the rover handicaps by failing to attain sufficient skill to maintain an average production when he is working. The third type consists of the goodly number of able-bodied youths who infest the street corners of our cities; and you will find them in the towns and villages also. These are the greatest offenders because they are idle practically from one year's end to another and thus contribute nothing to the welfare of the nation.

All these types have no interest but self and are absolutely blind to the part which it is intended they should play in the development of this nation—in fact, a part which they are obligated to perform, for Capt. John Smith's dictum is just as applicable to-day as when it was uttered. And yet one would expect that very element of selfishness to stimulate the accumulation of all the competence they can in anticipation of the time, which always comes, of stringency if not absolute want.

To the type of workman in industries THE IRON AGE represents this presentation will appear exaggerated, for he is industrious and is possessed of intelligence and foresight. To the man who is confronted with that trying problem of keeping his plant or department up to capacity, however, there is nothing overdrawn in the picture, and it presents at least a partial explanation of our shortage of labor. H. D. MURPHY.

Manufacturers of High Grade Ferrosilicon

The production of 50 per cent ferrosilicon is rapidly being increased in the United States. The Shawinigan Electro Products Company, Baltimore, which has a plant at Highlandtown, Md., completed a second electric furnace last summer which it recently started up and is now adding a third which it will use as a spare. The output of the two now running is from 10,000 to 15,000 tons of 50 per cent alloy per year. The company is booked well into 1917.

Another plant which is operating successfully is that of the Keokuk Electro Products Company, Keokuk, Iowa. There three furnaces are operating and there is good demand for the output. A third plant is that of the Mohawk Development Company at Fort Plain, N. Y., which has one furnace. The country's largest producer, the Electro Metallurgical Company, has an important operation at Niagara Falls, N. Y.

The greatly increased demand for high grade ferrosilicon since the war started has been the cause of this development. Some estimates of the present consumption in the United States go as high as 45,000 tons per year. Considerable is being sold to foreign countries by producers in this country and Canada.

Idle Virginia and Kentucky Furnaces Restarting

Unusual industrial activity is evidenced in eastern Kentucky and southwestern Virginia. Announcement comes from Big Stone Gap, Va., that the Intermont Coal & Iron Corporation, recently reorganized by R. T. Irvine, Dr. J. W. Kelley and others with a capital of $500,000, will have the blast furnace at that point ready for blast by Jan. 1. The plant has been idle since 1907. Additional properties have been purchased, and quite an enlargement is taking place.

At Middlesboro, Ky., the old Watts plant of the Virginia Iron, Coal & Coke Company has been rebuilt and one of the two furnaces was fired several days ago. The other will be running within a short time. A large part of the ore supply comes from northern Georgia, while the coke supply comes from the adjacent coking field of southwestern Virginia. Advices from Max Meadows, Va., are to the effect that the company's plant at that place is to be in operation by Dec. 1. Additional new properties have been obtained in the adjoining county of Buchanan, reached by a branch of the Norfolk & Western.

New Krupp Steel Plant

The Krupp new steel plant at Munich, Germany, is about completed and will start early in 1917, says the London *Ironmonger*. The buildings cover an area of about 70,000 square meters. The plant will not make armor plate or raw materials, but only finished steel, specializing in pressing, turning, shaping, grinding, polishing and mounting.

Silico-manganese, 50 per cent manganese and 30 per cent silicon, is now being made by the Noble Electric Steel Company, Heroult, Cal. It has been producing ferromanganese and pig iron in its electric reduction furnace of the shaft type.

COMING TARIFF REVISION

Is a "Bargaining Tariff" Foreshadowed?—Importance of the Webb Bill

WASHINGTON, D. C., Nov. 28, 1916.—Evidence is rapidly accumulating foreshadowing a more or less comprehensive revision of the Underwood-Simmons tariff act in the new Congress elected on Nov. 7, irrespective of whether Republicans, Democrats or independents are able to organize the new House and to dictate the make-up and policy of the Ways and Means Committee. Should the Republicans control, the revision will be frankly protective, though the increase in rates will be moderate. If the Democrats dominate the situation, it is probable they will devise what would be known as a "bargaining tariff" with maximum and minimum rates. In the event that the independents hold the balance of power and are sufficiently influential to prescribe the character of this legislation, the measure will probably be a compromise in rates between the Republican and Democratic projects, the object of the legislation being to prevent the flooding of domestic markets with low-priced foreign manufactures.

On the face of the returns covering the House of Representatives the Republicans now have a small plurality of three, but six members have been elected who will owe their allegiance to neither of the great parties, calling themselves variously Independents, Progressives, Progressive Protectionists, Prohibitionists, Socialists, etc. Already the leaders of both Republican and Democratic organizations in the House are seeking pledges of co-operation from these members and both sides are claiming sufficient acquisitions to give them control. As the situation is wholly unprecedented in the history of the country, the outcome cannot be foreshadowed, but the close division of the two great parties will undoubtedly make for conservatism and will prevent the forcing through of radical partisan legislative programs.

It has been well understood here for many months that if the new House should be controlled by the Republicans, the Ways and Means Committee early in the new Congress would prepare a tariff bill embodying a moderate upward revision of the rates of the existing law. Two impressive reasons have been brought forward in support of this plan; first, the practical experience during the period from Oct. 3, 1913, until Aug. 4, 1914, immediately following the passage of the Underwood-Simmons act and before the outbreak of the European war; second, the strong probability that the end of the great conflict will be promptly followed by an influx of cheap foreign goods. The experience during the ten months before the war is a matter of record to which the Republican leaders point as indicating what may be expected when the armies of Europe go back to peaceful occupations, with new standards of efficiency before them, with every incentive to indefatigable labor and with a consuming power greatly reduced by their comparative poverty.

THE "BARGAINING TARIFF" PROPOSAL

The Administration, since the recent elections, has been practically committed by the statements of high officials to the early enactment of a so-called "bargaining tariff," the details of which, presumably, are to be worked out by the tariff commission soon to be appointed. In a significant address delivered in the past week before the annual convention of the Nebraska Manufacturers' Association at Omaha, Dr. Edward E. Pratt, chief of the Bureau of Foreign and Domestic Commerce, declared that the adoption of a bargaining tariff must be included in the steps to be taken "to safeguard the future of our foreign trade." He admonished his hearers to "recognize the fact that peace in Europe will bring with it problems almost as great as, if not greater, than the problems that arose at the opening of the European war." "Foreign trade," he said, "often means the difference between prosperity and stagnation; it is a great stabilizer of business conditions, and a firm with a prosperous foreign trade department can depend on foreign orders to keep its wheels going when things are slumping at home." In Dr. Pratt's opinion, a bargaining tariff will enable us to meet the movement now on foot in Europe to centralize economic resources and finances and to put the governments of the belligerent countries behind their respective manufacturers in their effort to recover their lost trade. In this connection Dr. Pratt also emphasizes the importance of the early enactment of the Webb bill permitting American manufacturers to combine for the development of foreign trade.

Statements recently current in the daily press purporting to describe the President's intentions with respect to an extra session of Congress are unreliable. It can be stated on high authority that while the President has no present intention of bringing Congress together soon after the adjournment of the coming session in March, next, his mind is entirely open on the subject and his course will be controlled by developments. It hardly need be said that the ending of the European war would precipitate a situation in the United States that might call for immediate legislation, a fact that gives an added interest to the more or less authoritative statements which are now being put out by prominent public men of both parties.

W. L. C.

Proposed Reorganization of the Iron and Steel Institute

Impressed by the high state of organization of the American scientific and technical institutes and by the economy and convenience resulting from their common home in the Engineering Societies Building in New York, Sir Robert Hadfield made recommendations to the Iron and Steel Institute (London) recently, looking to the reorganization of that society. His suggestions may be classified as follows:

1. Improving the internal work of the institute by sub-committees.

2. Proposals with a view to closer relations with the overseas dominions and India.

3. The establishment of central premises for some or all of the principal technical societies, with their many attendant advantages, including a library service.

With reference to the last suggestion Mr. Hadfield pointed out that the various institutes representing American competitors are now beginning to reap the benefits of their wise policy of having the whole of the work, whether organization, routine, reading of papers, or library research, concentrated in one building, one library and one club. In other words, the United States has one common center for her technical institutes with all its resultant advantages to the metallurgist, mining, mechanical, electrical and civil engineer, including a saving of time, better organization and better work. With a view to increasing national efficiency to cope with after-the-war competition, he was of the opinion that the British should imitate the American example.

RESEARCH COMMITTEES

Dealing with the question of organization, Mr. Hadfield suggested that the Iron and Steel Institute might well consider the system adopted by several of the leading American institutes and to some extent already carried out by several British institutes—the delegation by the council of more work to committees and sub-committees appointed to deal with special subjects. At present the Iron and Steel Institute has only committees dealing with publications and Carnegie scholarships. The council holds about six meetings each year, at which the mass of general business to be dealt with is very considerable, so that sufficient time cannot be given to the many special subjects with which the institute is concerned. He invited consideration of the work of the American Institute of Mining Engineers, where a great deal of work is done by subdivision.

The steps he suggested and which to some extent were later adopted by the Iron and Steel Institute in regard to sub-committees were referred to in THE IRON

AGE of Nov. 2, 1916. Five scientific and technical committees are proposed, as well as a research committee, with about eight members each.

ZIRCONIUM AND INDUSTRIAL RESEARCH

In drawing attention to the organization of work in America, Sir Robert Hadfield laid special emphasis on the advisory committee to the United States Bureau of Standards at Washington and drew a parallel between the National Physical Laboratory and the technical applications of science by the Iron and Steel Institute. The importance of technical committees is shown by the statement that before the war Germany was obtaining over 100 tons a month of zirkite and apparently no one in England knew anything about it or took the trouble to investigate the question. Zirconia ores are now rapidly coming to the front as refractories and if a sub-committee existed it would be the duty of the chairman to report about twice a year to the council on subjects of this nature comprising new developments.

Millions for Navy Yards and Naval Bases

Fleet Bases at New York and San Francisco—Eight Yards to Be Equipped to Build War Vessels

WASHINGTON, D. C., Nov. 28, 1916.—A comprehensive project for the remodeling of all the leading navy yards and the creation of two completely equipped naval bases, involving an expenditure of from $50,000,000 to $100,000,000, has been laid before Congress in formal recommendations submitted to the House Committee on Naval Affairs by Rear Admiral Harris, chief of the Bureau of Yards and Docks. The object of this scheme of reorganization and expansion is two-fold: First, to provide for the equipment of at least eigh navy yards for the building of war vessels, and second to provide a complete innovation in the United States Navy, namely, a well located and fully protected base for naval fleets on both Atlantic and Pacific coasts. Both features of the project are put forward as necessary parts of comprehensive preparedness plans.

Coincidently with the presentation to the House Naval Committee of Admiral Harris's navy yard expansion scheme, the Navy Department announced that after several months' consideration and exhaustive investigation of the resources of all the navy yards it has been decided to expend the $6,000,000 appropriated at the last session of Congress for the enlargement of the navy yards at Portsmouth, N. H., Boston, Philadelphia, Norfolk, Va., Charleston, S. C., and Bremerton, Wash. This amount will be expended in accordance with a program which ultimately will put the Norfolk and Philadelphia yards in shape to construct capital ships, the Boston and Bremerton yards to build cruisers and other vessels up to 12,000 tons, and the Portsmouth and Charleston yards to construct gunboats, destroyers, submarines, high-powered motor boats, etc. When the six yards are fully equipped the Government will have four large establishments capable of building battleships, battle cruisers, etc., inasmuch as New York and Mare Island are now fitted up, though in some respects inadequately, for this class of work. Mare Island especially is not only lacking in important items of equipment, but the docks of that yard possess insufficient depth of water for the proper launching and berthing of battleships.

FLEET BASE IN NEW YORK HARBOR

The details of the department's general plan for developing the manufacturing facilities of the navy yards and especially for the creation of two big naval bases are now being worked out by a special board, the chairman of which is Rear Admiral Helm, who has had wide experience in the management of navy yards. The plan for the New York yard contemplates the separation of the industrial plant for the building of warships from all activities directly connected with the fleet and the transfer of the latter to a fleet base to be established on an island the Navy Department proposes to create below the Statue of Liberty in New York harbor. The new fleet base would be equipped with docking and repair facilities, large storehouses for equipment, commissary supplies, etc., tankage for large quantities of petroleum, which it is estimated the Navy will soon be consuming at the rate of 60,000,000 gal. per annum, coal pockets of large capacity, etc. The concentration of these supplies and facilities at the New York base, it is claimed, will greatly reduce the cost of maintaining the Atlantic fleet. It is not possible to estimate the exact cost of the establishment of the proposed base at New York, but in view of the work that must be done to prepare the site in the harbor it will undoubtedly run into many millions of dollars.

The desirability of creating a fleet base in the vicinity of Mare Island has been emphasized by conditions at that navy yard which have grown steadily worse with the increasing demands made upon it. The new project involves the establishment of a fleet base on San Francisco Bay at an expenditure of approximately $25,000,000, the equipment to duplicate substantially the facilities planned for the New York fleet base. During the consideration of this scheme the department gave some attention to a plan involving the moving of the navy yard to a point on San Francisco Bay where deep water could be secured, but inasmuch as the estimate for this transfer, including the establishment of a fleet base in the same vicinity, was approximately $75,000,000, this idea was abandoned and the department's revised plan involves the retention of the navy yard in its present location and the dredging of a channel to deep water for the accommodation of the largest vessels of the Navy.

The total estimate of the expenditure to be made at the Norfolk yard is $15,000,000, of which more than $4,000,000 has already been appropriated. This yard is designed for the building of battleships and, in connection with it, it is proposed to establish submarine and aviation training schools. The land owned by the Government at Norfolk is insufficient for this purpose and negotiations are now on foot for the purchase of the Jamestown Exposition tract.

ESTIMATES $66,000,000 ABOVE LAST YEAR'S

It is improbable that Congress, at the coming session, will provide the entire amount contemplated by the department's estimates for navy yard expansion. The construction program for the fiscal year ending June 30, 1918, is so large that the estimates now before the House Naval Committee exceed the record-breaking appropriations of the last session by $66,000,000. Much will be accomplished, in the opinion of the department officials, if the comprehensive plans receive Congressional endorsement together with substantial initial appropriations.

Officials of the department declare that the equipment of eight navy yards for construction purposes does not mean that the department proposes to build as many warships as possible, but that the great bulk of the naval construction of the future will be placed with private yards if bidders can be found who will take the work within the statutory cost limits. The fitting up of the Government yards will be to some extent a precautionary measure calculated to enable the Government to execute its building program without regard to the engagements of private shipyards, nearly

all of which promise for several years to come to be so fully occupied with commercial work as to make the taking of Government contracts a matter of patriotism rather than profit. W. L. C.

Germany's Control of the Basic Bessemer Process

An important contribution to the study of the basic Bessemer problem has been made by M. Fernand Engerand, a French economist and publicist, in a book entitled "L'Allemagne et le Fer." In dealing with the industrial as distinct from the sentimental aspect of Alsace-Lorraine, the author emphasizes the fact that the part of Lorraine which Germany annexed in 1871 contains, in the Minette iron ores, the largest deposits in Central Europe, while the valley of the Saar is an important coal field. Nearly all these deposits were French territory in 1814, but at the Vienna Congress of 1815 Prussia acquired the Saar Valley, and after the war of 1870-71 she seized what was then the whole known industrial wealth of Lorraine.

The whole of Germany's industrial imperialism is notoriously built upon the steel industry, the author says, which in turn is dependent on the Minette ore of the Lorraine district. Thus in 1913 Germany raised 28,600,000 tons of iron ore, of which 21,000,000 came from Lorraine. Of the estimated iron-ore resources of Germany representing 2800 million tons, Lorraine alone contains 2100 million tons. What M. Engerand considers a significant admission was made in a manifesto in September, 1915, by some of the German industrial associations in which the sentence occurred: "If the output of the Minette iron ore of Lorraine were to be interrupted, the war would be as good as lost."

The restitution of Lorraine, even with the Saar Valley included, would not be sufficient to break Germany's control of the basic Bessemer steel industry, continues the author, for the question of coal supply has to be considered. Before the war France imported, roughly, 21,000,000 tons out of 62,000,000 tons. The output of the Saar coalfield would make up for that deficiency, but the future needs would leave a new deficiency of about 36,000,000 tons. Under the freight conditions existing before the war probably the whole of this supply would have to be obtained from Westphalia, and the French iron industry would be more or less independent upon the good will of the Germans.

The solution of this metallurgical peace problem suggested is to make the Rhine with the adjoining rivers and canals a free international waterway. Then barges could take coal from Newcastle to Lorraine and return with iron ore for the Northeast coast blast furnaces. The method has already been put to practical demonstration by the Thyssen interests, whose ships carried Westphalian coke to Caen in Normandy before the war and brought back iron ore.

Canadian Industrial Notes

The Lake Superior Steel Corporation, Sault Ste. Marie, Ont., reports for the four months ended Oct. 31 a production of 131,600 tons of ingots and 82,500 tons of finished material. Production has not quite come up to expectations, due to labor difficulties, but conditions are improving. Some delay is being experienced in building two new 75-ton open-hearth furnaces, but, as far as can be seen, they will be completed by the end of the year, and the steel plant should then be able to produce about 45,000 tons of ingots monthly. On account of labor conditions it is doubtful if, beyond a third 75-ton open-hearth furnace, any attempt will be made to embark upon further new construction.

At a meeting held in Hamilton the directors of the Steel Company of Canada authorized additional plant appropriations and considered the question of extensions which will be incumbent upon the company to be undertaken in order to place it in a position to realize the fullest benefit from the expenditures and extensions already made and also having regard to the necessity of putting the operations of the company on the basis of the lowest possible cost of production to meet the competition which is inevitable when readjustment of trade conditions takes place.

The plant of the Pacific Steel Products, Ltd., at Bridgeport, on Lulu Island, B. C., is running steadily, turning out about 10 tons of iron and steel daily. Within 60 days the output is to be increased to about 30 tons. The company is constructing a new open-hearth steel furnace and installing two machines for turning out railroad spikes, bolts and nuts.

H. M. McLeod, general manager of the Canadian Northern Railway, Vancouver, B. C., announces that at Port Mann, B. C., a carbuilding plant will be in operation shortly, with a capacity of five cars per day.

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Bonuses to Workmen in French Shops

The Rowan System in Which the Bonus Is Proportioned to the Time Saved—Results in a Bronze Foundry

In *Revue de Metallurgie*, Paris, is an article by L. Revillon on a system of payment to employees consisting of a wage or salary with bonus. On the resumption of business in France one of the most important problems will be that of labor. In most of the plants that have been destroyed or stripped of material, the most modern labor-saving devices can be installed when they are started again; but at the same time the workmen will have to be trained anew to give them the habit of working and enable them to reach the maximum output with the new machines. To do this something must be done to stimulate their efforts, and it is impossible to make constant increases in salaries without giving some compensation to the manufacturer. It is for this reason that M. Revillon describes a wage and bonus system of American origin, which he used before the war in a particular instance and which he believes will solve the labor question in a great number of cases. His description, practically in full, follows:

It is not necessary to insist on the known disadvantages of payment by the hour. It is unjust because it does not allow at each instant the wage to be proportioned to the service performed by the workman. It is harmful to the workmen for it limits the maximum gain possible to a fixed amount, uniform for the same specialty and necessarily not very high. It is dangerous for the employer because it does not allow him to demand of the workman sufficient work to lower the cost of production to meet competition, or to obtain an output corresponding to a reduced selling price.

CURING THE DEFECTS OF PIECEWORK

Payment by piece work, which at the first glance seems to do away with all inconveniences for the manufacturer, is often looked on unfavorably by the workmen. As carried out in most plants it makes the average workman discontented, for he expects an increased income and does not receive it. Further, it makes the manufacturer dissatisfied, for he sees the wages of the very clever workmen increase out of all proportion without a lowering of the production cost being established. His effort, therefore, is to reduce the piece rate in order to realize his part of the profit. The workman, rather than suffer this constant reduction which he foresees, will limit his output, and very frequently from these opposing interests a conflict is born that is very difficult to adjust. The method of Taylor tries to guard aganst these difficulties by an exact determination of the time necessary to carry out each one of the separate tasks involved in manufacturing a given article. This determination, however, should be made by a clever and impartial man, and be repeated on the least change in the methods of production. It is further only applicable to articles made in large numbers and demands a high professional and moral character on the part of those carrying it out, as well as great willingness on the part of the workmen during the introduction of the system. There are so many diverse conditions that it is difficult to make them harmonize.

In looking for a more rational mode of payment, an effort must be made to find one in which the endeavors of the workman to increase his earnings bring about simultaneously a reduction in the cost of production, in such a way that the two parties have the same interest in looking for methods of increasing the output; that it to say, reducing the time expended on a given piece of work. The method of division, between the manufacturer and the workman, of the profits resulting from increased output should satisfy certain general conditions in order to arrive at the just wage that is being sought. It should allow the receipt by each workman of an amount in proper relation to the intensity of his efforts, the portioning out after a brief interval of the gain merited, and the calculating and controlling of the lowering of cost of production.

THE ROWAN SYSTEM

All these conditions are met satisfactorily by a method based on the bonus system of Rowan. This method was used in France by M. Revillon together with modern methods of cost accounting which give each day the net cost of the raw material in transformation on the one hand and that of the plant operations on the other in such a way that the results could be analyzed. It was found to be remarkably pliable for the most varying work, whether on one or many similar articles; its application did not bring about any difficulty on the part of the workmen in spite of the apparent complexity of the bonus calculations. The results were immediate, and at the end of several years it still gives complete satisfaction without the initial arrangements having to be changed. In certain cases it has given up to 50 per cent increase in production with 15 per cent and more increase in employees' pay. Below are given the principles of this method.

The workman continues to be paid by the hour at a normal rate, because of his trade value, which assures him a minimum day's wage suitable to the starting of a new piece of work, or some stoppage not of his bringing about, such as a failure of machinery or defect of tools, etc. However, the workman who habitually does not exceed this minimum is not a good workman; he is not clever or does not work hard, and there is no reason to try to keep him, because he does not produce profits. In general there is advantage in fixing the minimum sufficiently low so that the workman has no interest in holding it there. The workman is told the maximum time allotted to each of his tasks, whether based on similar work or after time studies, or best of all as shown later, according to an established cost of production or a desired selling price.

THE ADJUSTMENT OF THE BONUS

If the workman brings about a decrease in this maximum time he receives a bonus which is a function of the decrease that he has effected and is defined by the following formula: the relation of the bonus to the wage is equal to that of the time saved to the time given (or the rate of the bonus compared with the wage is equal to the quotient from dividing time gained by the time given). In short, the bonus is equal to economy of time realized. The pieces rejected for bad workmanship are not counted, and the time passed in making them is

added to that spent over the other pieces, and reduces the bonus. An example will illustrate the method: If the workman has a piece of work rated at ten hours and completes it in nine, he has saved one hour; that is a reduction of one-tenth. He will receive for these nine hours outside of his ordinary pay a bonus of one-tenth of this same pay. If he takes only eight hours, he will have during this time his usual wage and a bonus of two-tenths, and so on. In order to obtain the equivalent formula in the case of piece work, where it is desired to have a minimum number of pieces made in a fixed time, the bonus to add to the wage during this time is a fraction of the latter, representing the relation of the number of extra pieces to the total number of pieces made. For instance, if in a day of ten hours a man's task is to make 50 pieces and he produces 65, he will receive in addition to his wage for the ten hours a bonus of 15-65 of the salary.

In order to judge all the value of this method, it is necessary to look into the mathematical laws which indicate the realizable gains and the division of the profits between the two parties. In this way one sees how equitable is this method of division. In the first place, it is thoroughly favorable to the workman even for the smallest increases in output, which are often the hardest to attain. Then it increases the profit of the manufacturer to the extent of the time gained. He sees his profit constantly increasing by all the reduction in production cost, which remains fixed in piece work. There is then no necessity for him to reduce the time given, but on the contrary it is to his interest to make things more easy by constant improvements, for he receives his share of profit from the time gained.

SELLING PRICE AS A BASIS

This method can easily be made a profit sharing plan if some precautions are taken in the determination of the initial time to be given to each piece of work. To determine this time, an experimental method may be used similar to that recommended in the Taylor system, or a more equitable method may be used based on the possible selling prices. In the first case the time strictly necessary for the work under consideration is determined by preliminary experiments, and this is multiplied by a coefficient so that applied effort is demanded of the workman for part only of his time—in general, 8½ hours for a day of 12 hours. If a mistake has been made in the determination of this initial time, then the workman will gain a slightly higher bonus, but this is made up by a lowering of the production cost, depending on the time necessary, and equilibrium is quickly established.

In the other case, on the contrary, no previous experience is necessary in order to give the time necessary for a new piece of work. The time given will be such that it brings about a production cost, including all the general costs, equal to the selling price less the profit that it is desired to realize. In this supposition the profit only results from the gain in time realized by the workmen, and is immediately divided as shown above. It is the real profit sharing plan. Of course, it is proper to take from the selling price all the annexed costs, such as the cost of transportation, commissions, discounts, etc., then the cost of the raw material increased by all the costs of preparation. The remaining cost, which is that of manufacturing, will be divided by the production cost per hour of the workmen, a cost increased by so much per cent for the rejections, in which are included all the general manufacturing costs, such as the salaries of the officials, interest on the capital used and various sinking funds. The time of manufacture thus obtained should be divided between the various stages of manufacture.

If the workman cannot carry out one of the tasks in the maximum time given, he brings about a loss. The attention of the manufacturer should be immediately called to this part of the operation, for the fault may not be due to the workman, and the time given may actually be too little to carry out the work. All the other circumstances being normal, and the other tasks showing profits, it is then an indication of a producing cost too high or a selling cost too low, and the manufacturer must decide if he can increase his selling price, or if he should abandon this particular piece of work which absorbs a part of the profits of the other operations.

In any case the workman will try his best even for such unprofitable operations, for during the time that he gives to them he is getting his ordinary day's pay, while for the work which follows he may get a bonus which increases his earnings.

Evidently the problem is complicated if it deals with a complex article, a machine passing through several departments of a large works, but always a transfer price from one department to another can be reached by determining in each case the initial time as above.

A BRONZE FOUNDRY'S EXPERIENCE

The application of this method was made in a bronze foundry, working chiefly on patterns supplied by the customers, so that the work changed constantly, and the mold often contained a large number of pieces varying greatly in difficulty. The basis of the time given to the workman for each mold was the selling price, depending on the weight. According to the quality of the work demanded the price per kilogram of articles of the same difficulty may vary. To each corresponding selling price per kilogram a certain number of minutes were given the workman. The metal patterns being practically the same weight as the castings to be made, those to be used by the workman were weighed by kinds, according to his capacity and the care of which he was capable, multiplied by the number of minutes, and all the conditions of his work given on a card on which the workman recorded the beginning and the end of each of his tasks. On this, for verification, it was simply seen whether the total corresponded properly to the time passed at the plant.

In another concrete case concerned with the manufacture of articles in large numbers, tables were prepared showing directly the bonus according to the number of articles made. The paper closes by giving the simple mathematical calculations establishing the formulas for this particular case.

G. B. W.

The Union Electric Light & Power Company, St. Louis, for which a 10-story building has just been completed, will devote the entire top floor of the structure to the uses of its employees. A large auditorium will be included, with a stage and scenery as well as equipment for exhibitions, concerts, lectures, etc. A lunch room, library, rest room, demonstration room fitted up for practical use and a gymnasium are other features. The plan was devised by the late president, A. C. Einstein, and the details are being carried out by Secretary Herman Spoehrer.

An Australian plant for making wire cables and metal rope is to be established. An expenditure of about $1,000,000 is estimated as necessary to secure an output of approximately $5,000,000. Employment of 1000 men will be provided and not more than 10 men will be needed from outside the country, it is stated. All the raw material necessary, it is claimed, is obtainable in Australia.

Iron and Steel Markets

RAPID PIG-IRON ADVANCES

Pittsburgh Market Shows Excitement

Pig-Iron and Finished Steel Markets Show Increasing Disregard of Prices

With more excitement in steel making pig iron than has been seen in many years, iron and steel markets have gone on advancing. It was not to be expected that buyers would take less account of the price factor as higher levels were reached, but that is the outstanding feature. Bessemer iron went up $3 and basic iron $4 a ton in the past week as easily as they advanced $1 a ton in recent weeks.

As it appears that the amount of pig iron and of steel Europe needs to get in the United States is increasing over the 1916 rate of purchases here, domestic consumers in every line from iron ore to wire are making assurance of supplies for 1917 the paramount consideration.

Railroad, shipyard and building requirements of steel for next year, it has been more plainly indicated, will be placed without regard to price.

Rail buying for 1918 at $10 a ton above the price at which most of the 1917 deliveries will be made is already active. At Chicago upwards of 200,000 tons was closed including 57,000 tons for the New York Central and 52,000 tons for the Chicago & Northwestern and a subsidiary. With other New York Central purchases its total is between 150,000 and 175,000 tons. The Pennsylvania Railroad is expected to place about 205,000 tons.

Car orders increase in the face of nearly 100 per cent advance in the price of cars. The car builders are making more strenuous efforts with no success to get more steel for the earlier months of next year. This month nearly 25,000 cars have been placed, making a total of about 75,000 since Sept. 1, as against 70,000 for the whole year up to September.

Shipyard inquiry is overwhelming the mills. A domestic shipyard has paid 5c. on a 2500-ton plate order for the last half of next year. Late inquiries include 55,000 tons of plates and 20,000 tons of shapes for ten freight vessels to be built abroad and on which deliveries in the last half of 1917 will be accepted.

Of the 27,000 tons of 6-in. to 8-in. beams wanted for France, 20,000 tons has been taken, the bulk of it at 3.40c. Pittsburgh. Export business in many lines amounting to a large tonnage is being regularly put before steel makers but cannot be entertained. In the 38,000 tons of structural work before the Eastern market a large factor is shipyard extensions.

The week's advances in finished steel products include $3 a ton in wire products, effective Nov. 24, bringing wire nails to $3 and plain wire to $2.95; $2 a ton in rivets and $3 to $6 in sheets.

There is increasing difficulty in getting sheet bars. Sales of 30,000 tons for 1917 have been made to an Eastern company; on one 15,000-ton lot the basis was $56.50 Pittsburgh. At Youngstown a steel company bought 5000 tons of billets at $53, maker's mill. Forging billets have sold up to $80.

At Pittsburgh last week active buying of basic and Bessemer pig iron broke out, 60,000 tons of basic being taken on Wednesday and Thursday at $27 at furnace. Later sales of 34,000 tons were made by one producer at $30 for the second half of next year, and to-day that price is quoted by some furnaces for any delivery. Bessemer iron has sold at $33 and $33.50, and $35 is now asked. For shipment to France and Italy 75,000 to 100,000 tons of basic and Bessemer is before Central Western makers.

Buying of foundry iron at new high prices has been heavy, particularly in the East, and large consumers have been actively in the market. Probably 150,000 tons has been closed at New York in the past ten days. The week's advances have been from $2 to $3 a ton. Lake Superior charcoal iron has gone to $30 at furnace.

Alabama iron is largely taken up for the first half and 250,000 tons is the reported total of Birmingham sales for the second half.

Lake Superior iron ore producers have turned unprecedented reservations of Bessemer and non-Bessemer ores into contracts in the past week on the basis of prices established by sales on Nov. 23. The new prices which represent an advance of $1.50 a ton are $5.95 for old range and $5.70 for Mesaba Bessemer; $5.20 for old range and $5.05 for Mesaba non-Bessemer. The expectation that a $1.30 advance over 1916 prices would prevail was overturned on Nov. 22 by the announcement of 10 per cent wage advances by the leading steel companies, carrying with it an advance in iron mining wages.

Pittsburgh

PITTSBURGH, PA., Nov. 28, 1916.

The iron and steel market is running wild. In the past week prices on Bessemer pig iron have gone up $3 per ton or more. Basic iron has been advanced $4 or more, and there has been about the same rise in foundry, malleable, Bessemer and gray forge. Large quantities of sheet bars for extended delivery have sold as high as $56.50 and high carbon forging billets up to $80, Pittsburgh. Sheets are up anywhere from $3 to $6 per ton. Wire products have advanced $3 and rivets $2. Prompt furnace coke is higher by $1 or more per ton, and nearly all grades of scrap are from $2 to $4 per ton dearer. The high prices now ruling for pig iron and finished steel do not seem to check demand in the least but, on the contrary, it grows stronger. Predictions are freely made of basic iron going to $40 and Bessemer to probably $50. Much higher prices on nearly all kinds of finished steel seem absolutely certain. Any raw or finished material that cannot be sold to domestic consumers can be quickly disposed of for export at higher than domestic prices, and this is helping very much to put the market up. Makers and consumers of steel alike agree that prices long ago reached dangerous levels, but there is no way to stop the advances. Consumers are afraid they will not get material when they need it and insist that the mills put them on their books, the prices to be fixed later. The car supply is still very bad, and this is hurting ship-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 29, 1916.	Nov. 22, 1916.	Oct. 25, 1916.	Nov. 24, 1915.
No. 2 X, Philadelphia	**$27.50**	$25.50	$21.00	$17.75
No. 2, Valley furnace	**30.00**	26.00	21.00	16.00
No. 2 Southern, Cin'ti	**24.40**	23.90	18.90	16.40
No. 2, Birmingham, Ala.	**21.50**	21.00	16.00	13.50
No. 2, furnace, Chicago*	27.00	27.00	22.00	17.50
Basic, del'd, eastern Pa.	**27.00**	26.00	21.50	17.50
Basic, Valley furnace	**30.00**	25.50	20.00	16.00
Bessemer, Pittsburgh	**34.45**	30.95	24.95	17.95
Malleable Bess., Ch'go*	27.00	27.00	21.50	17.50
Gray forge, Pittsburgh	**29.95**	26.95	20.95	16.45
L. S. charcoal, Chicago	**28.00**	26.75	20.25	17.25
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	38.00	38.00	33.00	28.00
O.-h. rails, heavy, at mill	40.00	40.00	35.00	30.00
Bess. billets, Pittsburgh	**55.00**	52.50	50.00	28.00
O.-h. billets, Pittsburgh	**55.00**	52.50	50.00	29.00
O.-h. sheet bars, P'gh	**55.00**	52.50	50.00	29.00
Forging billets, base, P'gh	**80.00**	78.00	73.00	50.00
O.-h. billets, Phila	55.00	55.00	50.00	35.00
Wire rods, Pittsburgh	65.00	65.00	55.00	38.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia	2.659	2.659	2.659	1.859
Iron bars, Pittsburgh	2.90	2.90	2.75	1.65
Iron bars, Chicago	2.65	2.65	2.35	1.60
Steel bars, Pittsburgh	**3.00**	2.90	2.75	1.70
Steel bars, New York	**3.169**	3.069	2.919	1.869
Tank plates, Pittsburgh	4.25	4.25	4.00	1.90
Tank plates, New York	4.419	4.419	4.169	2.169
Beams, etc., Pittsburgh	3.00	3.00	2.75	1.70
Beams, etc., New York	3.019	3.019	2.869	1.869
Skelp, grooved steel, P'gh	2.85	2.85	2.50	1.70
Skelp, sheared steel, P'gh	3.00	3.00	2.60	1.80
Steel hoops, Pittsburgh	3.25	3.25	3.00	1.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Nov. 29, 1916.	Nov. 22, 1916.	Oct. 25, 1916.	Nov. 24, 1915.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	**4.00**	3.65	3.40	2.40
Sheets, galv., No. 28, P'gh	**5.50**	5.25	4.75	4.25
Wire nails, Pittsburgh	**3.00**	2.85	2.70	1.90
Cut nails, Pittsburgh	**2.95**	2.80	2.70	1.85
Fence wire, base, P'gh	**2.95**	2.80	2.65	1.75
Barb wire, galv., P'gh	**3.85**	3.70	3.55	2.75
Old Material, Per Gross Ton:				
Iron rails, Chicago	**$26.00**	$25.00	$22.00	$16.00
Iron rails, Philadelphia	24.00	24.00	21.00	17.50
Carwheels, Chicago	**20.00**	18.00	14.50	14.50
Carwheels, Philadelphia	**21.50**	19.00	16.00	14.00
Heavy steel scrap, P'gh	**25.00**	21.00	19.00	17.00
Heavy steel scrap, Phila	**23.00**	21.00	16.00	14.75
Heavy steel scrap, Ch'go	**23.00**	21.00	17.75	15.00
No. 1 cast, Pittsburgh	**19.50**	17.00	16.00	14.00
No. 1 cast, Philadelphia	**20.00**	19.00	16.00	14.50
No. 1 cast, Ch'go (net ton)	16.00	16.00	14.75	13.00
No. 1 RR. wrot, Phila	**25.00**	24.50	22.50	17.00
No. 1 RR. wrot, Ch'go (net)	**23.00**	22.00	18.00	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$7.00**	$6.50	$7.00	$2.10
Furnace coke, future	**4.00**	3.75	3.75	2.35
Foundry coke, prompt	**7.50**	7.00	5.00	2.75
Foundry coke, future	5.00	5.00	4.50	3.00
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**$4.00**	34.00	28.50	19.87½
Electrolytic copper, N. Y.	**34.00**	34.00	28.50	19.87½
Spelter, St. Louis	**13.00**	12.25	10.00	18.75
Spelter, New York	**13.25**	12.50	10.25	19.00
Lead, St. Louis	**7.17½**	7.00	6.92½	5.17½
Lead, New York	**7.25**	7.15	7.00	5.25
Tin, New York	**45.25**	45.12½	41.25	39.25
Antimony (Asiatic), N. Y.	**14.50**	14.00	13.00	39.50
Tin plate, 100-lb. box, P'gh.	$6.00	$6.00	$5.75	$3.40

ments to a great extent. Some betterment in the labor supply is looked for as soon as cold weather comes, as many men that now have outside jobs will seek warmer places in which to work.

Pig Iron.—There is a wildly excited pig-iron market, prices on all grades being up $3 to $4 per ton or more, and the end is not yet. At this moment there are active inquiries here for 75,000 to 100,000 tons of Bessemer and basic iron, mostly Bessemer, for shipment to France and Italy, mainly to the latter country. One dealer here a few days ago could have obtained $35 for Bessemer for 10,000 tons for prompt shipment to Italy, but could not find the iron for that delivery. On Wednesday and Thursday of last week there were sales of 60,000 tons or more of basic for delivery in the first half and some at the convenience of the sellers at $27 at Valley furnace, one Ohio interest buying 40,000 tons at that price, part of it from Pittsburgh and part through Cleveland interests. Following these sales came the announcement that the Struthers Furnace Company had sold about 34,000 tons of basic iron for delivery in the second half of next year at $30 net at furnace. It develops that one of two buyers of this iron was an eastern Pennsylvania steel company. There were no strings of any kind attached to these sales, but it was recognized that the price was a little above the market at the time, probably because of the extended delivery. As soon as the facts about these sales became known the whole basic market quickly advanced to $30 at Valley furnace, and it is not believed that any basic iron for any delivery could be bought to-day at less than that price. In fact, some sellers that have basic iron are asking $31 and a few $32 at furnace for it. About the time these sales of basic were made there were sales of Bessemer at $31 and $31.50 at Valley furnace, but, following basic, the Bessemer market quickly went up to $33 and $33.50 in actual sales nearly all sellers now holding for $35 at furnace. A sale of close to 5000 tons of Bessemer for delivery in the first half of next year is reported at $33.50, maker's furnace, and we regard that price as the market at this writing. Sales of foundry and malleable Bessemer iron have been made as high as $30 at furnace, but there is not much doing in gray forge. In the past week probably 20,000 tons of Bessemer was sold at prices ranging from $31 up to $33.50 at furnace, and the minimum asking price is now $35 at furnace, but as yet no sales are reported at that price. We now quote: Standard Bessemer iron, $33.50; basic, $30; malleable Bessemer, $30; No. 2 foundry, $30; gray forge, $29; all at Valley furnace. The freight rate for delivery in the Pittsburgh and Cleveland districts being 95c. per ton.

Ferroalloys.—There is quite a heavy demand for ferromanganese, some for delivery in the first quarter, but mostly for first half, and prices are stronger. English 80 per cent ferromanganese is now firm at $164, seaboard, and 80 per cent domestic is strong at $160 to $162 at furnace, with freight added to point of delivery. We quote 18 to 22 per cent spiegeleisen at $50 to $55, and 25 to 30 per cent at $65 to $75, delivered. We quote 50 per cent ferrosilicon for delivery next year in lots up to 100 tons at $100; 100 tons to 600 tons, $99, and over 600 tons, $98, all per gross ton, f.o.b. Pittsburgh. We quote 9 per cent at $32; 10 per cent, $33; 11 per cent, $34; 12 per cent, $35; 13 per cent, $36.50; 14 per cent, $38.50; 15 per cent, $40.50, and 16 per cent, $43. We quote 7 per cent silvery at $26.50; 8 per cent, $27; 9 per cent, $27.50; 10 per cent, $28; 11 per cent, $29, and 12 per cent, $30. These prices are f.o.b. furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., all of which have a freight rate of $2 per gross ton to the Pittsburgh district.

Billets and Sheet Bars.—A leading Eastern steel company has been scouring this market lately for a large quantity of sheet bars, estimated at 30,000 to 60,000 tons, and is reported to have closed for about 30,000 tons, of which 15,000 tons was taken by a local mill at the reported price of $56.50, Pittsburgh, and the remainder by a Cleveland interest. It would not be possible to buy any billets or sheet bars from local or Youngstown mills at less than $55. A leading Youngstown steel interest bought last week 5000 tons or more of soft steel billets for which it paid $53, maker's mill, to be used in rolling sheets, the company largely re-

serving its own output of steel billets and ingots of special analysis to fill export orders. We also note sales of 200 to 300 tons of forging billets at $80, delivered Pittsburgh. We now quote base sizes and base carbons of Bessemer and open-hearth billets and sheet bars at $55 to $57.50, maker's mill, Pittsburgh or Youngstown; forging billets, $80 for sizes up to, but not including, 10 x 10 in. and for carbons up to 0.25.

Plates.—Orders for cars continue to be placed with amazing rapidity in view of the high prices charged by the carbuilders and of the fact that deliveries will be quite distant, as the car companies are now filled up for some months ahead. The Great Northern has ordered 100 box cars from the Pressed Steel Car Company, to be built at its Chicago works. The Pressed Steel Car Company has also secured orders for 1250 steel hopper cars from the Union Railroad Company (owned by the Steel Corporation), 500 steel hoppers from the Delaware, Lackawanna & Western, 350 ore cars from the Northern Pacific (to be built in its Chicago works), 1000 steel hoppers from the Wabash-Pittsburgh Terminal, 1000 steel gondolas from the Southern and 1500 steel gondolas from the Burlington (to be built in its Chicago shops). The Nickel Plate, which is in the market for 500 steel hoppers, is also inquiring for 750 composite gondolas. It is said that inquiries are now before the steel carbuilders for 18,000 to 20,000 cars of various types. The situation as regards deliveries of plates is getting tighter. The two leading local mills are practically sold up for all of 1917 and it is predicted that mill prices of plates will go to 5c. within a few months. We quote sheared tank plates ¼ in. and heavier, at 3.50c. at mill, with no promise of delivery; 4c. to 4.50c. for second to third quarters, and 5c. and upward for small lots for fairly prompt shipment, all f.o.b. at mill, Pittsburgh.

Structural Material.—Inquiry is still quite active. The American Bridge Company has taken 2500 tons of plate work for the Southern Railway, 710 tons for extensions to buildings of the Browning Company, Cleveland, and 225 tons for extensions to open-hearth buildings of the American Rolling Mill Company, Middletown, Ohio. The Pittsburgh-Des Moines Steel Company has taken 200 tons for an addition to buildings for D. C. Clark & Co., in this city. We quote beams and channels up to 15-in. at 3c. at mill, with no promise of delivery, and from 3c. to 3.25c. for second and third quarter shipment in 1917; small lots from warehouse stock, 3.50c. to 3.75c., Pittsburgh.

Steel Rails.—No large rail contracts for 1918 delivery have been taken by the local interest. The demand for light rails is active from the coal-mining interests and prices are firm; one or two makers are asking higher prices and a general advance is looked for in the near future. We quote 25 to 45 lb. sections at $47; 16 and 20 lb. $48; 12 and 14 lb., $49; and 8 and 10 lb., $50; in carload lots f.o.b. at mill, the usual extras being charged for less than carload lots. We quote standard section rails of Bessemer stock at $38 and of open-hearth $40, per gross ton, Pittsburgh.

Tin Plate.—The situation is steadily getting tighter. While most consumers have covered their needs as far as they could for delivery in the first half of next year, some have not yet bought enough and are in the market for considerable lots. It would be impossible at present to place orders for delivery in the first half with any mill at less than $6.50 per base box, and most makers are quoting higher. There is no doubt that the price of tin plate for delivery in the second half will be $2 and possibly $3 per box higher than prices for first half delivery, which ranged from $5.75 to $6 per base box. Mills report the export demand heavy, and are constantly turning down foreign orders, on which they could probably obtain $7.50 per base box or more. Only three or four makers are in good position to take export orders, namely, those that recently added new mills. Prices on current small orders are strong, primes and wasters from stock being quoted mostly at $7 per base box at mill. We quote bright plate, 14 x 20, at $6 to $6.25 per base box, f.o.b. Pittsburgh, on contract for delivery in the first half of 1917, and small lots of primes and wasters from stock at $6.50 to $7 per base box at mill.

Sheets.—The past week, prices on Bessemer black and galvanized sheets and tin-mill black plate have advanced from $5 to $7 per ton. The absolute minimum of the market on No. 28 Bessemer black sheets is now 4c., this being the nominal price of the American Sheet & Tin Plate Company, which has practically no sheets to sell for the first quarter. Independents that have some sheets to spare for first quarter are quoting 4.25c., and a few as high as 4.50c. at mill. On galvanized sheets, the absolute minimum is 5.50c. on No. 28, this being really a nominal price, most makers quoting from 6.50c. to 7c. at mill. The demand is much beyond the capacity of the mills to supply as promptly as needed. Prices on blue annealed sheets have also advanced, but not to the same extent as on other grades. Still higher prices seem certain. At this writing a fair range of prices in carloads and larger lots are about as follows: Blue annealed sheets, Nos. 3 to 8, 3.75c. to 4c.; box annealed, one pass, Bessemer cold-rolled sheets, No. 28, 4c. to 4.25c.; No. 28 galvanized, 5.50c. to 6c.; No. 28 tin-mill black plate, 4c. to 4.10c., all f.o.b. Pittsburgh.

Shafting.—Most consumers are covered for the first quarter and a few of the largest consumers have been permitted to cover for the first half, owing to the fact that their product is such they must know at least six months in advance what their shafting is going to cost them. Several makers have caught up to some extent on deliveries and are able to ship more promptly than they could have done some time ago. We quote cold-rolled shafting at 20 to 15 per cent off in carload lots and 10 per cent off in less than carload lots for first quarter and first half of 1917, f.o.b. Pittsburgh, freight added to point of delivery.

Railroad Spikes and Track Bolts.—One leading maker of railroad spikes is very indifferent about selling, and is quoting from 2.75c. to 2.90c., depending on the size of the order and the delivery wanted. New demand is more active and it seems certain that prices on spikes will soon be advanced to $2.75 or higher. Railroads are not specifying freely against contracts. The demand for track bolts is quite active, and several makers state that prices will advance in the near future. We quote track bolts with square nuts at 4.50c. to 4.75c. to railroads and 5c. to 5.25c. in small lots to jobbers, base. Track bolts with hexagon nuts take the usual advance of 15c. per 100 lb. Prices on spikes are as follows:

Standard railroad spikes, 4½ x 9/16 in. and larger, $2.65 to $2.75; railroad spikes, ½ to 7/16 in., $2.75 base; railroad spikes, ⅜ in. and 5/16 in., $3.05 base; boat spikes, $2.80 base, all per 100 lb., f.o.b. Pittsburgh.

Wire Products.—Effective Monday, Nov. 27, prices on wire and wire nails were advanced $3 per ton, putting wire nails on a $3 basis. However, even this advanced price is largely nominal, as local makers say they can readily sell wire nails at $3.25 base per keg if they can make the deliveries. Nearly all the large wire and wire-nail interests are sold up so far ahead they have called in most of their men from the road and are now taking only specific orders. Prices now in effect are as follows: Wire nails, $3, base, per keg; galvanized, 1 in. and longer, including large head barbed roofing nails, taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire is $3.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.95; galvanized wire, $3.65; galvanized barb wire, and fence staples, $3.85; painted barb wire, $3.15; polished fence staples, $3.15; cement-coated nails, $2.90, base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to the point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are 53 per cent off list for carload lots, 52 per cent for 1000-rod lots and 51 per cent for small lots, f.o.b. Pittsburgh.

Wire Rods.—With a famine in the supply, and with an abnormally heavy demand, makers of rods can get practically whatever they ask if they can make the deliveries wanted. A sale of 3000 to 5000 tons of

soft rods for export is reported to have been made by a local mill last week at about $75 a ton at mill. Domestic consumers that are not fully covered for the first quarter and first half are nervous over the situation and several have asked their regular sources of supply to put them on their books for certain quantities, the prices to be fixed later. We quote soft Bessemer, open-hearth and chain rods at $65 to $75 per gross ton, f.o.b. Pittsburgh, but it would probably be difficult to buy any large quantity at less than $70.

Iron and Steel Bars.—The nominal price of the Carnegie Steel Company on steel bars remains at 2.90c. at mill, but with no promise of delivery. Other makers that can ship in the first or second quarter are quoting 3c. to 3.25c., prices depending on the quantities involved and deliveries wanted. Specifications against contracts for steel bars are abnormally heavy. Most of the leading mills are well sold up through the first half, while the Carnegie Company is reported to be largely sold up for all of next year. The demand for reinforcing steel bars is active, with prices higher. The sharp advance in gray forge pig iron is likely to result in higher prices on iron bars. Warehouses are now quoting steel bars and small shapes, including flats, rounds and squares, under 2 in., at 3.65c; 2 in. and over, 4.30c.; H-sections, 3.85c. We quote merchant steel bars at 2.90c. at mill, with no promise as to delivery, and from 3c. to 3.25c. for delivery in the second and third quarters of 1917. We quote refined iron bars at 2.90c. to 3c., and railroad test bars 3c. to 3.10c., f.o.b. Pittsburgh.

Hoops and Bands.—Mills that can promise deliveries on hoops and bands are quoting steel bands from 3c. to 3.25c. and steel hoops, 3.25c. to 3.50c. at mill. Most large consumers are covered through the first quarter and first half at lower prices.

Nuts and Bolts.—Makers state that the recent advance of $5 a ton on nuts and bolts is not only firmly held, but it is likely another raise will be impreative in the near future, because of the advancing prices for steel and the shortage in supply of labor. They are not catching up on deliveries. Discounts are as follows, delivered in lots of 300 lb. or more where the actual freight rate does not exceed 20c. per 100 lb.; terms 30 days net or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 50 per cent; small, cut thread, 40 and 7½ per cent; large, 35 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 and 5 per cent; small, cut thread, 40, 10 and 5 per cent; large, 40 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 and 5 per cent; large, 30 and 5 per cent. Bolt ends, h. p. nuts, 40 per cent; with c. p. nuts, 30 and 5 per cent. Lag screws (cone or gimlet point), 50 per cent.

Nuts, h. p. sq. and hex., blank, $2.60 off list, and tapped, $2.40 off; nuts, c. p. c. and t. sq., blank, $2.20 off, and tapped $2 off; hex., blank, $2.50 off, and tapped, $2.25 off. Semi-finished hex. nuts, 60 per cent. Finished and case-hardened nuts, 60 per cent.

Rivets, 7/16 in. in diameter and smaller, 45 and 10 per cent.

Rivets.—Late last week another advance of $2 a ton was made. Most consumers are covered at lower prices than are now ruling over the first quarter and in some cases through the first half of next year. Makers' prices are now as follows: Buttonhead structural rivets, ½ in. in diameter and larger, $4.25 per 100 lb., base, and conehead boiler rivets, same sizes, $4.35 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net or one-half of 1 per cent for cash in 10 days.

Cold-Rolled Strip Steel.—Contracts for delivery in first quarter only continue to be made at $6.50 to $7 per 100 lb. Makers say they will not sell for delivery beyond the first quarter, owing to the uncertainty of raw material and labor costs. On current orders for fairly prompt shipment makers quote $7 for fair-sized quantities up to $7.50 per 100 lb. for small lots. Terms are 30 days net, less 2 per cent off for cash in 10 days, delivered in quantities of 300 lb. or more when specified for at one time.

Wrought Pipe.—The demand for all kinds of tubular goods, including oil-well supplies, is still abnormally heavy. Mills are sold up on lap-weld pipe for six to eight months, but on butt-weld sizes can make deliveries in 8 to 10 weeks. Some quite large inquiries for line pipe are in the market, but it is not likely that any will be closed, as the mills cannot make the deliveries wanted. Another advance in prices is looked for, possibly by Dec. 1 or shortly after. Discounts on black and galvanized iron and steel pipe are given on another page.

Boiler Tubes.—Local makers of both iron and steel boiler tubes are largely sold up through 1917, and heavy premiums in prices are readily paid on either iron or steel tubes for delivery in three to four months. Prices are likely to be advanced again at an early date. Discounts in effect at this writing are given on another page.

Coke.—Due to shortage of cars and labor, there was a heavy decline in the output of coke the past week, with the result that prices on prompt furnace coke advanced upward of $1 a ton. Sales of 60 and 70 carloads of high-grade furnace coke for prompt shipment were made on Monday of this week at $7.50 per net ton at oven. Other grades, not so high in quality, are being offered at $6.75 to $7. As yet, nothing is doing in contracting for furnace coke for first half delivery. Most producers are disposed to hold for not less than $4 per net ton at oven and a few for $4.50. Some furnacemen that have not covered their coke needs for first half say they will buy from month to month and take chances. On Monday of this week most of the producers had only 60 per cent or less of the cars needed, although Monday is regarded as the best day in the week for getting a full supply. We quote best grades of blast-furnace coke for spot shipment at $7 to $7.50 per net ton at oven, and on contracts $4. The best grades of 72-hr. foundry coke for spot shipment are held at $7.50 to $8, and on contract for first half all the way from $5 to $6. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended Nov. 18 as $398,299 net tons, a decrease over the previous week of 23,214 tons.

Old Material.—Sensational advances in prices were made on nearly all grades of scrap the past week. Selected heavy steel for open-hearth purposes advanced from $3 to $4 per ton on heavy purchases by the Cambria Steel Company, while other grades advanced $1 to $3 or more. The heaviest advance of all was in low phosphorus melting stock, which went up $5 to $6. Dealers claim that scrap is now only coming into its own and that higher prices are certain. Basic pig iron has sold as high as $28 at furnace for first quarter and first half delivery, and it has always been figured that heavy steel scrap is intrinsically worth as much as basic iron. The amount of heavy steel scrap bought by the Cambria Company is given as 25,000 tons, and it is said that for much of this $25, delivered at Johnstown, Pa., was paid. A local consumer that has not figured in the market as a buyer for some time is said to be offering $25 for upward of 10,000 tons of heavy steel scrap, but has not been able to obtain it. It is difficult to quote the market, as prices are advancing rapidly. At this writing, prices named by dealers for delivery in Pittsburgh and consuming points that take Pittsburgh freight rates, per gross ton, are about as follows:

Heavy steel melting scrap, Steubenville, Follansbee Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	$25.00 to $26.00
No. 1 foundry cast	19.50 to 20.00
Rerolling, rails, Newark and Cambridge, Ohio; Cumberland, Md., and Franklin, Pa.	28.00 to 29.00
Hydraulic compressed sheet scrap	18.50 to 19.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	15.00 to 15.50
Bundled sheet stamping scrap	14.50 to 15.00
No. 1 railroad malleable stock	22.00 to 23.00
Railroad grate bars	14.00 to 14.50
Low phosphorus melting stock	30.00 to 31.00
Iron car axles	43.00 to 45.00
Steel car axles	43.00 to 45.00
Locomotive axles, steel	47.00 to 50.00
No. 1 busheling scrap	19.00 to 20.00
Machine-shop turnings	10.50 to 11.00
Old carwheels	21.00 to 22.00
Cast-iron borings	11.50 to 12.00
*Sheet bar crop ends	24.00 to 25.00
No. 1 railroad wrought scrap	22.00 to 23.00
Heavy steel axle turnings	14.50 to 15.00
Heavy breakable cast scrap	18.00 to 19.00

*Shipping point.

Chicago

CHICAGO, ILL., Nov. 26, 1916.

The record of the market is largely one of advances in prices following each other in rapid succession. In the last week higher prices were put into effect on several grades of pig iron, structural steel, plates, bars, sheets, wire products and cast-iron pipe, while the prices of scrap have moved upward almost with every transaction. Store prices also advanced, galvanized sheets moving up $20 per net ton. The number of mills that have any product to sell grows smaller with each week, while inquiry received by local producers comes increasingly from distant and unnatural sources. The business of the week in rolled steel products was tremendously heavy, consisting largely of rails for 1918 delivery, plates and shapes for the carbuilders, and bars to the amount of about 50,000 tons for the general manufacturing and implement trades. Rail sales entered on the books or closed last week approximated 250,000 tons, among which the larger purchases were those of the New York Central and the Chicago & Northwestern. The Pennsylvania Lines are inquiring for 205,000 tons. In the pig-iron market, activity was largely associated with standard Bessemer, charcoal and Southern irons. To represent the scrap market during the interval of a week by any one list of prices is impossible. Each sale appears to be followed by a further advance.

Pig Iron.—Buyers generally are on the anxious seat, wrestling with the problem of last half iron. There appears to be no unanimity of opinion, and the fear of pig-iron shortage and the apprehension of a break in prices seem equally at work to divide those who have bought from those who have not. Most of the selling for the last half has been done by the Southern furnaces, the Northern producers quoting for that delivery only where competition is sought by the buyer. For that delivery the Southern situation presents a wide range of prices. Sales of No. 1 and No. 2 Southern foundry on the basis of $21.50, Birmingham, for No. 2 are noted, while as high as $25 is asked by other interests. Sales have also been made on the basis of $22, Birmingham. Buyers are giving considerable attention to the question of deliveries and are favoring those brands promising the greater assurance of delivery on schedule. The selling of high phosphorus Northern iron at equivalent to $26.75, Chicago, may be attributed in part to the above fact. Charcoal iron was sold last week on the basis of $26.25 at furnace for No. 2, but the more common quotation is a minimum of $27 at furnace. Sales of standard Bessemer at Chicago were made on the basis of $30 to $32 in the valley. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, Nos. 2 to 5	$28.00 to $29.00
Lake Superior charcoal, No. 1	28.50 to 29.50
Lake Superior charcoal, No. 6 and Scotch	29.00 to 30.00
Northern coke foundry, No. 1	27.50
Northern coke foundry, No. 2	27.00
Northern coke foundry, No. 3	26.50
Northern high phosphorus foundry	25.00 to 25.50
Southern coke No. 1 f'dry and 1 soft	26.00 to 26.50
Southern coke No. 2 f'dry and 2 soft	25.50 to 26.00
Malleable Bessemer	27.00
Basic	27.00
Low phosphorus	40.00
Silvery, 8 per cent	35.50 to 36.00
Bessemer ferrosilicon, 10 per cent	40.50 to 42.50

Rails and Track Supplies.—Total purchases of 1918 rails by Western railroads now approximate 500,000 tons, including 50,000 tons placed by the Missouri Pacific with the Pueblo mill, delivery of which will begin in 1917 and extend into 1918. The buying of rails for 1918 delivery continued last week, and as a result total sales amounted to about 300,000 tons in the past fortnight. Among the large purchases of the week were those of the New York Central and the Chicago & Northwestern. The Pennsylvania Lines have put out their inquiry for a total of 205,000 tons. The railroads are also buying largely of track fastenings, the Rock Island alone taking 16,000 tons of tie-plates. The price of spikes presents one of the conspicuous anomalies of the situation, being practically the same as the price of the bars from which they are made. Quotations are as follows: Standard railroad spikes, 2.75c. to 2.90c., base; track bolts with square nuts, 4c. to 4.50c., base, all in carloads, Chicago; tie-plates, $52 to $54, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, $38, base; open hearth, $40; light rails, 25 to 45 lb., $44; 16 to 20 lb., $45; 12 lb., $46; 8 lb., $47; angle bars, 2.25c.

Structural Material.—Carbuilders again bought very heavily of steel, but new car sales in the week included no transactions of large importance. Contracts for the fabricating of steel for building purposes were more numerous and called for an aggregate of 8000 tons. The largest order was for 3500 tons of bridge steel for the Chicago & Northwestern Railway, to be supplied by the American Bridge Company, which will also furnish 750 tons of bridge steel for the Gary, Ind., Land Company and 750 tons for a cold storage warehouse at St. Louis. The Baker Iron Works will fabricate 1000 tons for a Los Angeles building and the Hansell-Elcock Company 300 tons for a seminary at Chicago. Western mills last week announced a further advance of $2 per ton in the price of structural steel, bringing the Chicago price to a parity with the Pittsburgh quotation, and we quote for Chicago delivery of structural steel from mill 3.189c.

The price of structural steel from store has been advanced $7 per ton and we quote for Chicago delivery 3.70c.

Plates.—A very limited tonnage of plates is to be had in this market at any price, even those mills which have been catering to prompt shipment business being in most instances practically out of the market. A further advance of $3 per ton in the price of plates for contracts has been announced, and we quote for Chicago delivery of plates from mill, at its convenience, 3.689c.; for prompt shipment, 4.189c.; in widths up to 72 in. and for wide plates, 4.939c. to 5c.

In keeping with an advance of $7 per ton announced last week, we quote for Chicago delivery of plates from jobbers' stocks 4.35c.

Sheets.—With inquiry from individual consumers running as large in some instances as 1100 tons, most of the producers have little to offer other than constantly advancing quotations intended to discourage the placing of orders. Higher prices are again announced for all grades of steel and we have revised our prices accordingly. We quote, for Chicago delivery, No. 10 blue annealed, 3.689c.; Nos. 3 to 8, 3.839c.; box annealed, No. 16 and lighter, 4.189c. to 4.289c.; No. 28 galvanized, 5.689c. to 6c. These quotations are minimum prices for contracts. Early shipment quotations are $5 to $10 per ton higher.

Substantial advances in the prices of sheets from store have been announced and we quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 4c.; No. 28 black, 4.60c.; No. 28 galvanized, 6.50c.

Bars.—Without any traceable reason, purchases of steel bars last week were large, and sales totalling 50,000 tons are reported. Another advance of $2 per ton has been made. Inquiry for bar iron continues heavy, but local mills are not encouraging the placing of orders. The makers of rail carbon steel have advanced their prices to the basis of 2.75c. at the mill and have become very conservative in their selling policy because of the scarcity of rerolling rails, one mill having been shut down for two weeks for lack of this raw material. We quote mill shipment, Chicago, as follows: Bar iron, 2.65c. to 2.75c.; soft steel bars, 3.089c.; hard steel bars, 2.75c.; shafting, in carloads, 20 per cent off; less than carloads, 15 per cent off.

Jobbers have advanced their prices for bars $5 per ton and we now quote store prices for Chicago delivery as follows: Soft steel bars, 3.60c; bar iron, 3.60c; reinforcing bars, 3.60c, base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting net list.

Rivets and Bolts.—With new contracts generally taken care of for the last half, and specifications very generally scheduled over some time in the future, a comparative lull is apparent since the announcement of the higher discounts on bolts and nuts. We quote

as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 50; cut thread, 40-7½; larger sizes, 35; machine bolts up to ⅝ x 4 in., rolled thread, with hot pressed square nuts, 50-5; cut thread, 40-10-5; large size, 40; gimlet-point coach screws, 50; hot pressed nuts, square, $2.60 off per 100 lb.; hexagon, $2.60 off. Structural rivets, ¾ to 1¼ in., 4.15c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 4.50c; boiler rivets, 4.60c; machine bolts up to ⅝ x 4 in., 50; larger sizes, 40-5; carriage bolts up to ⅝ x 6 in., 40-10; larger sizes, 35-5; hot pressed nuts, square, $3 and hexagon, $3 off per 100 lb.; lag screws, 50-5.

Cast-iron Pipe.—Another advance of $2 per ton has been announced in the price of cast pipe. For 1250 tons of pipe to be bought at St. Paul the leading interest is the low bidder. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $42.50; 6-in. and larger, $39.50, with $1 extra for class A water pipe and gas pipe.

Wire Products.—Prices for wire products have been again advanced $3 per ton and still the mills are receiving more orders than they can accept. We quote as follows per 100 lb.: Plain wire, Nos. 6 to 9, base, $3.239; wire nails, $3.189; painted barb wire, $3.339; galvanized barbed wire, $4.039; polished staples, $3.339; galvanized staples, $4.039; all Chicago.

Old Material.—Prices of scrap are advancing almost without pause. Scarcely any two transactions for the same classes of material are at the same price. Following each transaction, a further advance is asked by the dealers, and since the large purchases of heavy melting and shoveling steel last week on the basis of $23 for the former and $21 for the latter, prices are already quoted at an advance of $1 per ton. Buying by consumers is general and persistent, and dealers acting for them are bidding against each other in the market for the limited supply of scrap available. In some lines, particularly rerolling rails, the scarcity is especially pronounced. An indication of this condition is had in the fact that the only railroad offering of importance is that of 2000 tons from the Burlington. Inquiry for various classes of scrap is coming into the market from many consumers in other districts, the inquiry for carwheels from Pittsburgh and from St. Louis being noted in particular. The disproportion between the amount of scrap apparently available for purchase in the market and heavy consumption grows more pronounced each week, and the upward tendency of prices has no promise in sight of being checked. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$26.00 to $27.00
Relaying rails	27.00 to 28.00
Old carwheels	20.00 to 21.00
Old steel rails, rerolling	26.50 to 27.50
Old steel rails, less than 3 ft	24.50 to 25.00
Heavy melting steel scrap	23.00 to 24.00
Frogs, switches and guards, cut apart	23.50 to 24.00
Shoveling steel	21.00 to 21.50
Steel axle turnings	12.00 to 12.50

Per Net Ton

Iron angles and splice bars	$27.00 to $27.50
Iron arch bars and transoms	27.50 to 28.00
Steel angle bars	20.50 to 21.00
Iron car axles	33.00 to 34.00
Steel car axles	37.50 to 38.00
No. 1 railroad wrought	23.00 to 24.00
No. 2 railroad wrought	22.00 to 23.00
Cut forge	22.00 to 23.00
Pipes and flues	16.00 to 16.50
No. 1 busheling	19.00 to 19.50
No. 2 busheling	13.25 to 13.75
Steel knuckles and couplers	23.50 to 24.50
Steel springs	23.50 to 24.50
No. 1 boilers, cut to sheets and rings	13.50 to 14.00
Boiler punchings	19.50 to 20.00
Locomotive tires, smooth	25.00 to 26.00
Machine-shop turnings	8.50 to 9.00
Cast borings	7.75 to 8.25
No. 1 cast scrap	16.00 to 16.50
Stove plate and light cast scrap	12.75 to 13.25
Grate bars	13.00 to 13.50
Brake shoes	13.00 to 13.50
Railroad malleable	17.00 to 17.50
Agricultural malleable	15.00 to 15.50

Philadelphia

PHILADELPHIA, PA., Nov. 28, 1916.

The pig-iron market has continued to advance, and precise price levels of the various grades are difficult to determine. While sales have been made at the top quotations, it is doubtful if there is any broad buying at these figures. But the market is unquestionably strong, and if the export demand continues to develop it is not improbable that the predicted $35 level for No. 2 X foundry may be reached. Low phosphorus has touched $50, delivered, and basic has been sold at $30, furnace. Virginia No. 2 X has sold at $29, furnace. A plate maker has advanced his quotation on tank plates to 5c., Pittsburgh, base, or 5.159c., Philadelphia, and has booked large orders at that price. Other makers, nevertheless, continue to ask 4c. and upward, Pittsburgh. Structural material is more active, and one mill has advanced its quotation one-quarter cent to 3.25c. Sheets are higher at 4c., Pittsburgh, for No. 10 blue annealed. The railroads continue to show interest in 1918 rails, the Canadian Pacific trying to secure reservation of space for 50,000 tons. The spot coke market is a little easier. The old material market is excited and prices are advancing by leaps and bounds.

Pig-Iron.—So rapid have been the advances in all grades of pig iron, with the prices paid depending largely on the state of mind of buyers and sellers, that it is difficult to correctly gage the market. Quotations which are good to-day may be worthless to-morrow. There appears to be no consensus of opinion in the matter of prices, consequently their spread is greater than usual. On one thing all agree, and that is the strength of the market and the probability that prices will continue to advance. The situation is attributable to the export demand, which gives promise of even greater expansion in view of the fact that most of the European countries are short of iron. A big export buyer has asked one iron interest to submit a memorandum of all the iron of any delivery he can sell for export. In the face of the existing situation many producers are not anxious to sell, because they are well sold ahead, are holding for higher prices, or both. Predictions are that the price will go to $35 for No. 2 X. Eastern Pennsylvania No. 2 X is quoted at this writing at $28, furnace, or about $28.75, delivered. Virginia iron, for last half delivery, has been sold at $28 and $29, furnace, the iron, however, being special in character. A comparatively small lot of eastern Pennsylvania basic for first half delivery has been taken at $29, delivered. For carwheel iron, $29, furnace, has been paid. A sale is reported of 1500 tons of charcoal iron on the basis of $30, Buffalo. Southern iron shows considerable irregularity, some furnaces quoting $21.50, Birmingham, while a sale of a small lot of No. 3 is said to have been made at $22.75, first half delivery. Standard low phosphorus is quoted at $49 to $50, with the makers having but little left to offer. One interest entered 5000 tons at prices ranging from $47 to $50, delivered. The Lenoir Car Works has an inquiry out for 2400 tons, made up of four grades. The entire market is in an unsettled condition that cannot last indefinitely, but the question is how and when it will begin to resume a more natural course. Quotations for standard brands delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry	$27.50 to $28.50
Eastern Pa. No. 2 plain	27.00 to 28.00
Virginia No. 2 X foundry	28.00 to 29.00
Virginia No. 2 plain	27.75 to 28.75
Gray forge	25.00 to 26.00
Basic	27.00 to 29.00
Standard low phosphorus	49.00 to 50.00

Iron Ore.—In the week ended Nov. 25 importations from Sweden consisted of 9497 tons. None came from other countries.

Ferroalloys.—The West is reported to be very active, but the situation here is but little changed. For foreign 80 per cent ferromanganese, the quotation is $164, seaboard, and for prompt domestic $165, delivered. On first half domestic probably $160 could be done. The quotations for imported material have unquestion-

ably been kept down by the large production in this country. Ferrosilicon, 50 per cent, is held at $100, Pittsburgh, for carloads, and $99 for 100-ton lots. The quotation for 11 per cent ferrosilicon is around $39.44, delivered.

Plates.—The range of quotations for tank plates is from 4.159c. to 5.159c., Philadelphia. The situation is peculiar in that business is being placed from the bottom to the top of the range, and those commanding the higher price are picking orders that are desirable. On 2000 tons of sheared plates on which September delivery was promised, 5.159c., Philadelphia, was agreed upon. Sales are being made for export to Japan and other countries, one lot of 5000 tons being taken for Japanese delivery. A Norwegian, who is canvassing the trade for boiler and hull plates, states that his people got German plates until September last, when they ceased to receive shipments. Ship plates are quoted at 5c. to 6c., Pittsburgh, with some of the mills not offering. One mill quotes a minimum of 4.659c., Philadelphia, and another 4.159c. on ordinary steel. The mill quoting the maximum will not extend or enlarge contracts already in operation. In the week it has entered orders for 10,000 tons of universal plates, and these it now holds at 4.159c., Philadelphia, an advance of one-quarter cent. The fabricators of structural shapes are seeking plates more actively and a Pacific coast shipyard wants material for three steamships.

Bars.—The market is active with steel-bar quotations ranging from 3.059c. to 3.159c., Philadelphia. The Pennsylvania Railroad is inquiring for 2000 tons of steel bars. Iron bars are still 2.659c., Philadelphia, officially, but business has been done at 2.759c. and 2.859c., Philadelphia.

Structural Material.—A fresh impetus has been given to shapes, and the pressure on one Eastern mill has caused it to advance its quotation to 3.25c., mill, or Pittsburgh, depending on whether shipments are made east or west. The demand for export and from shipyards continues to lead. It is noted that the heavy demand for ship shapes is causing an extra burden to be thrown on those mills which do not make them inasmuch as the makers of ship shapes have more of the latter than they can care for. Ship shapes are quoted at 3.659c., Philadelphia. Worth Brothers, formerly plate makers of Coatesville, Pa., prior to selling out to the Midvale Steel & Ordnance Company, who have formulated plans for a new mill at Claymont on the Delaware River, are asking for bids on the steel work required by four open-hearth furnaces. It is estimated that the project will require about 5000 tons. The Pennsylvania Railroad is inquiring for 1000 tons.

Billets.—On distant deliveries the quotation for open-hearth rerolling billets is $55, and for forging steel, $75.

Sheets.—The makers are not sold so far ahead as they are in most other products, this being their policy. The demand is good and prices have been advanced to 4.159c., Philadelphia, for No. 10 blue annealed.

Rails.—It was erroneously stated last week that $50 had been paid for a small lot of steel rails. Such a sale was agreed upon but later canceled. For 500 tons of standard rails, first half delivery, shipment in that period to be at the convenience of the mill, $45 has been paid. One mill quotes $50 from stock, and $55 for less than carloads, these rails not being of the first quality. Several of the railroads continue to seek the reservation of mill capacity in 1918, one such inquiry involving 50,000 tons, coming from the Canadian Pacific Railroad.

Coke.—The spot foundry situation appears a little easier although $9 to $9.50 per net ton at oven is quoted. Contract foundry is nominal at from $6 to $6.50. Prompt furnace is about $7.50 per net ton at oven, and $4 has been offered, without result, for contract. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.95. and Mountain, $1.65.

Old Material.—The market has been excited, and prices have been correspondingly uncertain. A good business has been done for delivery both in and out of this territory. Coatesville is not under embargo. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$23.00 to $24.00
Old steel rails, rerolling	26.00 to 28.00
Low phos. heavy melting steel scrap	30.00 to 33.00
Old steel axles (for export)	45.00
Old iron axles (for export)	45.00
Old iron rails	24.00 to 25.00
Old carwheels	21.50 to 22.50
No. 1 railroad wrought	25.00 to 26.00
Wrought-iron pipe	18.00 to 19.00
No. 1 forge fire	15.50 to 16.50
Bundled sheets	15.50 to 16.50
No. 2 busheling	12.00 to 13.00
Machine-shop turnings	12.00 to 12.50
Cast borings	12.50 to 13.00
No. 1 cast	20.00 to 21.00
Grate bars, railroad	15.00 to 15.50
Stove plate	16.50 to 17.50
Railroad malleable	16.50 to 17.50

Cleveland

CLEVELAND, OHIO, Nov. 28, 1916.

Iron Ore.—Lake Superior ore prices for 1917 were established at an advance of $1.50 per ton over this year's prices by a sale made by W. P. Snyder & Co., Pittsburgh, of 185,000 tons of Mesaba non-Bessemer made late in the afternoon of Nov. 22. Following the establishment of the ore-carrying rates at an advance of 50c. per ton, or double the net contract rate for 1916, some of the ore firms favored $1.30 advance and others held for the higher price. For the past few years the price finally established has been, in several instances, somewhat lower than the price favored by some of the sellers, but this year the maximum price considered was adopted. Although 1916 prices ranged from 70c. to 75c. above those of the previous year, with increased mining costs, including an advance in wages, mining companies shared very little the current year in the general prosperity of the blast furnaces and steel plants. A further increase in mining costs due to higher wages, advance in the cost of coal and supplies and higher royalties on a sliding scale contract will absorb considerable of the addition to the price of ore so that it is estimated that the net increase to the mining companies, after also deducting the 50c. increase in carrying charges, will be only about 60c. to 70c. per ton. Reservations have been made for a very heavy tonnage of ore in the past few weeks, taking the bulk of the available supply, so that there will not be a heavy buying movement when the market becomes active. Reservations are now being written into contracts, and a few sales have been made since the establishment of prices to consumers who had not previously made reservation. As most of the steel companies have reserved ore for their requirements, additional buying will come mainly from the small merchant furnaces. The Eastern steel companies have made large reservations of 1917 ore and shipments to the East next year are expected to be as heavy as in 1916. In addition to the fact that there were large stock piles at the opening of this season of navigation, which helped in making the record-breaking season's movement, but which were all cleaned up this fall, consideration in estimating the 1917 movement will have to be taken of the fact that in many of the open-pit properties in the Mesaba range the ore of good grade was well cleaned out during the rush of the present season, and the output of these mines is likely to be curtailed next year. Owing to the delays caused by the cold weather and frozen ore the November movement, it is estimated, will amount to only about 4,000,000 tons. As a result of the delay, some of the shippers are behind on their schedules and will keep their boats in operation about two weeks in December if weather conditions permit. We quote 1917 prices as follows, delivered lower Lake ports: Old range Bessemer, $5.95; Mesaba Bessemer, $5.70; old range non-Bessemer, $5.20; Mesaba non-Bessemer, $5.05.

Pig Iron.—With $3 a ton added to the cost by the advance in ore prices, and other blast-furnace costs going upward, pig-iron prices continue to rise. Cleveland quotations on foundry and malleable iron have been advanced $2 to $3 per ton, now ranging from $30 to $31 on basic iron and $29 to $30 on foundry and malleable grades. Bessemer iron is quoted at $33 to

$35 by Valley furnaces. A Cleveland interest last week sold 34,000 tons of basic iron for shipment from its Valley furnace at $30. A considerable tonnage of Southern iron has been sold in the past few days at $22, Birmingham, for last half, which is claimed to be the minimum price. For early delivery $23 and higher is being quoted. First quarter Southern iron is scarce. Furnaces are being asked for prices on Northern and Southern foundry grades for first half of 1918, but refuse to quote. Some Virginia iron is coming into this territory, being available for prompt shipment, and is quoted at $23.75 to $25 at furnace for prompt and $25.75 for the last half. Ohio silvery iron has advanced sharply and is in good demand for last half. We note the sale of 500 tons of 8 per cent silvery at $34 and on an inquiry for 1000 tons for last half from a Cleveland foundry a quotation of $38 was made yesterday. A sale of standard low phosphorus is reported at $49. We quote, delivered Cleveland, as follows:

Bessemer	$33.95
Basic	30.30
Northern No. 2 foundry	$29.30 to 30.30
Southern No. 2 foundry	26.00 to 27.00
Gray forge	27.45
Jackson County silvery 8 per cent silicon	36.62 to 39.62
Standard low phos., Valley furnace	45.00 to 49.00

Coke.—There is some demand for foundry coke for prompt shipment, which is quoted at $9 to $9.25 per net ton at oven for standard Connellsville brands. Some Virginia coke has been sold at $7 for the first half. Connellsville foundry coke is quoted at $6.50 for that delivery.

Finished Iron and Steel.—New demand continues active, particularly for plates from the tank shops, which are getting a heavy volume of business. There is a tendency toward higher prices for early shipment, and mills that have been able to make rather good deliveries are getting further behind. One Cleveland mill has advanced its price on light plates to 4.50c., Pittsburgh. The range in plate prices is from 4c. to 4.50c. One Eastern mill has advanced its price on structural material to 3.25c., Pittsburgh. In structural lines the McClintic-Marshall Company has taken 2000 tons for a new plant for the National-Acme Mfg. Company, Cleveland. Fabricators are inquiring for second quarter contracts and some are buying steel out of stock for work under contract. Because of advancing prices of scrap, iron bars have been advanced to 3c. and hard steel bars to 2.90c., at mill. The sheet situation is growing worse. Many mills are refusing to quote and the production is reduced considerably by the scarcity of sheet bars. We quote sheets at 4c. to 4.50c., Ohio mill, for No. 28 black; 3.75c. for No. 10 blue annealed, and 5.50c. to 6.50c. for No. 28 galvanized. Cleveland warehouse prices have been advanced $5 per ton on iron and steel bars, plates and structural material. Prices are now as follows: Steel bars, under 2 in., 3.75c.; squares and rounds, 2 in. and over, 4.25c.; structural material, 3.85c.; plates, 4.35c.; iron bars, 3.70c., and hoops, 4.50c. Stock prices on blue annealed sheets have been advanced $7 per ton, to 4.25c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues active and prices are firm at the new quotations. The demand for rivets continues fairly heavy. We quote rivets at 4.25c., Pittsburgh, for structural, and 4.35c. for boiler. Bolt and nut discounts are as follows:

Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 50; cut thread, 40 and 7½; larger or longer, 35. Machine bolts with h.p. nuts, ⅝ x 4, smaller or shorter, rolled thread, 50 and 5; cut thread, 40, 10 and 5; larger or longer, 40. Lag bolts, gimlet or cone point, 50. Square and hexagon h.p. nuts, blank, $2.60 off the list; tapped, $2.40 off. C.p.c. and t. hexagon nuts, all sizes, blank, $2.50 off; tapped, $2.25 off. Cold pressed semi-finished hexagon nuts, 60 off.

Old Material.—The local market is quite active and sharp advances have been made on some grades. Several lots of heavy melting steel, aggregating 15,000 tons or more, were purchased by Cleveland mills late in the week at $23 and higher. Later the market eased off a little and sales were made at $22. However, dealers today are asking $23.50 for No. 1 heavy melting steel scrap. Carwheels quoted a week ago around $17 have sold as high as $24 for prompt shipment. Steel axle turnings have sold at $16.50. Railroad malleable scrap is very scarce, owing to the fact that little is being placed on the market by railroads and has advanced about $2 per ton. Railroad wrought is about $3 per ton higher. Borings and turnings have advanced about $2. A local mill has purchased 1000 tons of No. 1 busheling at $17, but for early delivery, and for future shipment dealers have advanced prices. Some of the present market quotations are represented by a wide spread and dealers are holding some grades for considerably higher prices than the usual quotations. The local activity in heavy steel scrap put Cleveland prices as high if not higher than Valley quotations, although heavy steel scrap in Cleveland is usually from $1 to $2 per ton lower than Valley prices. The heavy movement of scrap is being interrupted by railroad congestion. The Pennsylvania Railroad is refusing to accept scrap shipments for Youngstown and the congestion is also interfering with shipments to Canton and Sharon. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Steel rails	$20.75 to $21.00
Steel rails, rerolling	24.00 to 24.50
Steel rails under 3 ft	26.00 to 27.00
Iron rails	27.00 to 27.50
Steel car axles	42.00 to 43.00
Heavy melting steel	22.50 to 23.50
Carwheels	23.00 to 24.00
Relaying rails 50 lb. and over	28.00
Agricultural malleable	16.50 to 17.00
Railroad malleable	22.00 to 22.50
Steel axle turnings	16.50 to 17.00
Light bundled sheet scrap	13.75 to 14.25

Per Net Ton

Iron car axles	$38.00 to $40.00
Cast borings	10.25 to 10.50
Iron and steel turnings and drillings	10.25 to 10.50
No. 1 busheling	18.00 to 18.50
No. 1 railroad wrought	24.00 to 25.00
No. 1 cast	18.00 to 18.50
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50

Cincinnati

CINCINNATI, OHIO, Nov. 26, 1916.

Coke.—Spot prices in all districts vary so much that no exact quotations can be made. It is simply a question of being able to make prompt shipment of coke urgently needed and the seller fixes his own price. There is not much new business and practically no contracts are being made. Some Connellsville furnace coke is reported sold as high as $8 per net ton at oven, but operators would probably take on future business at $4 to $5, and would doubtless accept foundry coke contracts for last half at 50c. to $1 a ton higher. The same conditions exist in the Wise County and Pocahontas fields. The car shortage is still a factor that is having considerable effect on the spot market.

Pig Iron.—The tonnage booked last week was much smaller than the previous week's record, although it was far ahead of the average. Rapidly advancing prices on the part of producers, both South and North, have induced some melters who have not bought very far ahead to seek cover, and this has caused the marking up of prompt and first half quotations above those for the last half of next year. A little Southern No. 2 foundry iron can be bought at $21.50 for this year's delivery, but for the first half of next year $22, Birmingham basis, is considered minimum. As far as last half of 1917 is concerned, $21, Birmingham, can be done, but the range in quotations is fully $4 a ton. Indiana melters bought several lots of Southern iron for shipment in the last half of next year, the largest sale reported being 700 tons. Quite a number of medium-sized sales were made to central Ohio consumers. The tonnage of Southern iron that will be shipped to northern Ohio melters in the last half of 1917 will surpass any previous record. Northern foundry iron has been slow, as Hanging Rock producers are unable to take on any business for shipment before July 1, and the available foundry, malleable and basic in that district for last half delivery is rapidly being disposed of. A large producer in that district advanced last half quotations this week to a basis of $28, Ironton, but desirable busines can be taken on now at $1 less. In central Ohio two lots of Northern malleable, 500 and 1000 tons respectively, were sold for last half movement. Reports that further large sales of basic

were made last week appear to be without foundation. The inquiry is comparatively light, the largest being from the Southern Railway for 2500 tons of foundry iron to be delivered in the first quarter at Lenoir, Tenn. A local consumer wants 500 tons of Southern foundry iron for first half shipment. The Ohio silvery irons are still advancing, and are quoted to-day all the way from $32 to $34 at furnace, based on an 8 per cent analysis. Foundry iron contractors are urging forward shipments, and as a consequence yard stocks are increasing. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$24.90 to $28.40
Southern coke, No. 2 f'dry and 2 soft	24.40 to 27.90
Southern coke, No. 3 foundry	23.90 to 27.40
Southern coke, No. 4 foundry	23.40 to 26.90
Southern gray forge	22.90 to 26.40
Ohio silvery, 8 per cent silicon	33.26 to 35.26
Southern Ohio coke, No. 1	28.76 to 29.76
Southern Ohio coke, No. 2	28.26 to 29.26
Southern Ohio coke, No. 3	27.76 to 28.76
Southern Ohio malleable Bessemer	28.26 to 29.26
Basic Northern	28.26 to 29.26
Lake Superior charcoal	26.20 to 27.20
Standard Southern carwheel	26.90 to 27.40

Finished Material.—Local warehouse prices have been advanced all along the line and business is very brisk. Most of the orders taken last week were at the old quotations, but the figures given below are firmly adhered to now. In spite of the high price of building material, there is an excellent demand from different sources. It is reported that mill shipments have been more satisfactory of late, yet there is considerable delay on quite a number of orders that were placed several months ago. We quote from jobbers' stocks as follows: Structural material, 3.80c. base; plates, 4.35c.; No. 10 blue annealed sheets, 4.15c. to 4.25c.; bars and small shapes, 3.50c.; rounds and squares, 2 in. and over, $4.25c.; flat bars, 1 in. and over, 4.25c.; cold-rolled shafting, 10 per cent plus list; wire nails, $3.40 per keg base; barb wire, $4.40 per 100 lb. The nearby mills are quoting to-day No. 28 galvanized sheets at 6.25c., Cincinnati or Newport, Ky., and No. 28 black sheets at 4.40c. to 4.50c.

Old Material.—Advance on almost all grades of scrap are now a daily occurrence. Old iron rails, rerolling rails and heavy relaying steel rails are all up $2 a ton. Cast scrap is also up on an average of $1, and even borings and steel turnings that have been a drug on the market for some time have been advanced 50c. The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

	Per Gross Ton	
Bundled sheet scrap	$13.75 to	$14.25
Old iron rails	24.00 to	24.50
Relaying rails, 50 lb. and up	28.00 to	28.50
Rerolling steel rails	23.00 to	23.50
Heavy melting steel scrap	20.00 to	20.50
Steel rails for melting	20.00 to	20.50
	Per Net Ton	
No. 1 railroad wrought	$20.25 to	$20.75
Cast borings	6.50 to	7.00
Steel turnings	6.50 to	7.00
Railroad cast	16.00 to	16.50
No. 1 machinery cast	17.75 to	18.25
Burnt scrap	10.00 to	10.50
Iron axles	32.75 to	33.25
Locomotive tires (smooth inside)	26.00 to	26.50
Pipes and flues	13.50 to	14.00
Malleable cast	14.50 to	15.00
Railroad tank and sheet	11.50 to	12.00

Buffalo

BUFFALO, N. Y., Nov. 28, 1916.

Pig Iron.—Sales are unabated, transactions of the past week aggregating 25,000 tons, all grades, largely for last half delivery. A large consumer has taken a considerable quantity of iron for shipment to its English branch, being forced to cover its needs in this country. Domestic inquiry at the same time is increasing in pressure for all grades of iron. The minimum on all grades for prompt shipment has reached $30, except on very low silicons. This price is being held for any available delivery over next year by all but one interest, the latter quoting $28 to $30 on last half. Steel-making irons are being quoted well beyond $30 and up to $36. Pig iron produced outside of this district is being offered at $26 to $28, delivered at Buffalo district points. Grade differentials have wiped out to such an extent that the customary schedule for the time being is eliminated and a general range of $28 to $30 at furnace for deliveries including all quarters of next year takes its place.

Finished Iron and Steel.—Pressure for deliveries is increasingly strong. Prices have been advanced again both on mill and warehouse deliveries. The scarcity of tin plate is causing users to pick up stock wasters at a minimum of $7 per base box. Wire products are up $3 per ton. The Canadian demand for wire rods remains unsupplied and users there may be forced to shut down for lack of material. Inquiry reaches here through Canada for 16,000 tons of shipbuilding material for Norway. A large tonnage of 5½-in. billets has been sold from this market for Italy, with further large inquiries for billets for Italy and France. The McClintic-Marshall Company has taken a contract for 400 tons of steel for a plant addition of the Atlas Crucible Steel Company, Dunkirk.

Old Material.—The market is strong and very active. Prices are advancing daily. Heavy melting steel is extremely scarce. A distinct shortage is in sight, also marked scarcity in other grades of scrap. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$21.50 to $22.00
Low phosphorus billet and bloom ends	27.50 to 28.00
No. 1 railroad wrought	26.50 to 27.00
No. 1 railroad and machinery cast	19.50 to 20.00
Steel axles	35.00
Iron axles	35.00
Carwheels	19.50 to 20.00
Railroad malleable	19.00 to 19.50
Machine shop turnings	10.50 to 11.00
Heavy axle turnings	15.50 to 16.00
Clean cast borings	10.50 to 11.00
Iron rails	22.00 to 22.50
Locomotive grate bars	15.50 to 16.00
Stove plate (gross ton)	14.75 to 15.00
Wrought pipe	16.00 to 16.50
No. 1 busheling scrap	18.50 to 19.00
No. 2 busheling scrap	14.00 to 14.50
Bundled sheet scrap	14.50 to 15.00

Birmingham

BIRMINGHAM, ALA., Nov. 27, 1916.

Pig Iron.—The week witnessed only one change in the market, that being an advance on Nov. 22 for last half delivery from $20 to $21. The large interests assert that $21 is the minimum for last half 1917 delivery and that $23 is about the best that can be done for spot or first half. One maker, absolutely out of the market since Nov. 8, was still declining to quote. The other makers are nearer the same price basis than since the rise began. As a rule, they have adopted the policy of offering a certain amount of iron at the market price, and when that amount is sold they wait the next rise before re-entry. In this manner regular customers are taken care of and afforded opportunity to purchase before the next rise. The status of the makers is illustrated by that of a leading concern, which has only 10 per cent of its probable make left for first half delivery. All are running from the spot market rather than seeking it. Sales into the second half, made at from $19 to $21, probably aggregate 250,000 to 350,000 tons, of which 20,000 tons of basic went to an Eastern buyer at $20 for last half 1917 delivery. No more basic is to be had except for the last half. Some spot iron, especially when sold through brokers, goes as high as $24 and $25, but the furnace interests have not participated in such prices. The judgment of makers is that the market is going higher, but they are not forcing it. Sloss-Sheffield, Republic, Tennessee and Woodward companies have all raised wages of employees from 10 to 15 per cent in mining departments. So many of the negroes who left for the North in the early autumn are returning in the face of winter that a feared labor shortage does not now exist. Decrease in stocks is reported by almost all makers. Warrant iron stocks are so low, probably only 50,000 tons, as to be a negligible quantity. We quote, per gross ton, f.o.b. Birmingham district furnaces, for first and last half and spot, respectively, as follows:

No. 1 foundry and soft	$21.50 to $23.50
No. 2 foundry and soft	21.00 to 23.00
No. 3 foundry	20.50 to 22.50
No. 4 foundry	20.25 to 22.25
Gray forge	20.00 to 22.00
Basic	21.00 to 23.00
Charcoal	25.00 to 26.00

Cast-Iron Pipe.—Reluctantly the cast-iron pipe makers have marked prices up again, this time to a level which it is apprehended will serve to stop a lot of business. Municipal bonds voted for certain improvements will not cover specifications at present prices. In some instances makers report that wooden pipe is being substituted for cast iron. However, sufficient orders came in prior to the last rise to prevent curtailment of plant operation. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $37; 6-in. and upward, $34, with $1 added for gas pipe and 16-ft. lengths. These quotations are uniform.

Coal and Coke.—Delivery is the only question in the coal market. All sorts of prices are obtained, but the larger dealers, with long-standing customers, are content with $3 for run of mine. Stoppages of operations at steam plants are frequent and in at least one Southern city the street car line was put out of business. The car situation is better, but the demand is larger. Monterey, Mex., wants 12,000 tons of coke. Birmingham district makers are quoting around $5 per net ton at oven for standard beehive coke for 1917 delivery and the price is no check to the booking of business to capacity. Higher prices are imminent. Furnace coke brings from $3.50 to $4.

Old Material.—The scrap market is erratic, but the movement is mostly upward. There is no regularity in prices, as much as $2 and $3 difference between sales of the same material occurring, according to the ability to move the scrap and the disposition of the buyer. Steel axles, if available in quantities, would bring $35. Mills are kept on the anxious seat. The car shortage also affects prices. We quote, per gross ton, f.o.b. dealers' yards in Birmingham, as follows:

Old steel axles	$26.00 to $32.00
Old steel rails	16.50 to 17.00
No. 1 wrought	17.00 to 17.50
Heavy melting steel	16.00 to 16.50
No. 1 machinery cast	15.50 to 16.00
Carwheels	14.50 to 15.00
Tram carwheels	14.00 to 14.50
Stove plate and light	11.50 to 12.00

New York

NEW YORK, Nov. 29, 1916.

Pig Iron.—Buying in the Metropolitan district in the past week has been heavy and some important interests have participated in it. It is probable that including iron bought in New York by large companies having plants in different parts of the country, the total put under contract in the past two weeks has been upward of about 150,000 tons. Buying is less now than it was a week ago and high prices have made some buyers hesitate, while the contrary has been the effect with others. There are some indications of anxiety by consumers who have as yet few or no orders for castings for the second half. One railroad equipment interest placed about 8000 tons for New York State and Western plants. In New Jersey one buyer has taken up 1500 tons of charcoal iron and is now figuring on 2500 tons of coke iron. Another New Jersey buyer has closed for 4000 to 6000 tons for the first half of next year. In New England the buying last week was quite considerable, a large interest taking 25,000 tons or more of malleable pig iron. The International Steam Pump Company's wants for second half, probably 20,000 tons, have been satisfied, the business being distributed among a number of furnaces, including the eastern Pennsylvania district. One furnace in that district has put its price at $28.50 for No. 2 X foundry. Buffalo furnaces are selling at a range of $28 to $30 for No. 2 X for the last half. Canada has been a good buyer of Buffalo iron of late. One Buffalo stack has been banked for lack of coke. The two Niagara furnaces in that district are not expected to get in for some months, possibly one in the late spring of 1917 and the other later. The eastern Pennsylvania furnaces are now quoting No. 2 X at $27.50 to $28.50 at furnace. The leading Virginia producer is out of the market, being well sold up for next year. Virginia iron is quoted at $26 at furnace for No. 2 X, which would make the delivered price in New England $29.25 or quite a little under Buffalo iron. Firms buying iron for export are inquiring for both foundry and Bessemer irons to go to England, France, Norway and Italy. There is some inquiry for Southern warrants both from foundries and speculators. The range is now from $20 to $23, Birmingham. Labor demands at blast furnaces, iron mines and coal mines are continuous. West Virginia coke shipments have been affected by strikes in the mines there, particularly in the Broad Top region. We quote at tidewater for early delivery: No. 1 foundry, $29.50 to $30; No. 2 X, $29 to $29.50; No. 2 plain, $28.50 to $29; Southern iron at tidewater, $28.50 to $29 for No. 1 and $28 to $28.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Sales of at least 9000 tons of ferromanganese, mostly domestic, have been closed, bringing the total for the past fortnight to about 14,000 tons. The delivery stipulated in most cases is the first half of 1917, though some sales are for the last half. The consideration was from $160 to $165, delivered, though it is reported some sales have been made at $158. The British alloy is still held at $164, seaboard, with no indication of a reduction to meet the competition of the domestic product. Inquiries are more active, mostly for forward delivery, though one for 200 tons for December-January delivery is noted. Arrivals are in the usual proportions and domestic production in October was over 21,000 tons. An inquiry for 1000 tons of spiegeleisen has appeared. The quotation is $50 to $55, furnace, on the 20 per cent grade, but it is understood not much is available. Ferrosilicon, 50 per cent, is selling at $99 to $100, delivered, with the demand brisk, especially from foreign consumers to whom considerable has been sold.

Structural Material—The large things in the way of new business embrace 10,000 tons for the Newport News shipyard, 5000 tons for the New York Shipbuilding Company, 6000 for the Philadelphia Navy Yard, 5000 for the new Worth Brothers' plant on the Delaware River, 2300 tons for the Poughkeepsie railroad bridge, and all of 6000 tons for the Lehigh Valley, not to mention another offering from the Pennsylvania for two bridges taking 900 tons. The general building situation is also holding its own with a Schwartz loft, West Twenty-second Street, New York, 900 tons; an office building on Thirty-second Street, 1500 tons, and an office building in Baltimore taking 250 tons. Railroad purchases include 3500 tons for the Chicago & Northwestern, 475 for the Wabash and 300 tons, besides two turntables, for the Great Northern, all placed with the American Bridge Company, and 200 tons for the Grand Trunk, awarded to the Lackawanna Bridge Company, and 150 tons for pier 39, North River, for the Jersey Central, to Milliken Brothers, Inc. The general building contracts closed include 1000 tons for some office buildings in Philadelphia placed with the American Bridge Company; 1200 tons for the Rodin Studio, placed with the Hinkle Iron Company; 500 tons for the Mosby department store, Richmond, Va., awarded to the Richmond Structural Steel Company; 1000 tons for the General Electric Lamp Works, Providence, to the Providence Steel & Iron Works; 450 tons for the Engineering Societies' Building addition, to the American Bridge Company, which also took 200 tons for Phelps, Dodge & Co. and 1250 tons which has been bought by the Mead-Morrison Company. It appears that all of the 27,000 tons of 6, 7 and 8-in. beams for France have not been placed, but that perhaps as much as 7000 tons is still pending. Warehouse prices have pretty generally been advanced $5 per ton and we now quote from warehouse at 3.75c., New York. We quote mill shipments of plain material at 3.019c. to 3.169c., New York.

Steel Plates.—Universal plates are still obtainable in three to five weeks and at 3.75c., Pittsburgh; several thousand tons of tank plates have been sold for even better delivery at 4c., but a large tonnage of ship plates to a domestic builder for delivery in the last half took no less than 5c. per lb., and a lot of as much as 100 tons of marine boiler steel has been sold at 10.40c., Pittsburgh base. There is apparently no abatement in

foreign inquiry. One of the latest involves 55,000 tons of plates and 20,000 tons of shapes for ten cargo vessels to be built abroad and a late Italian inquiry covers 6000 tons of plates and 2000 tons of shapes. A $5 advance has been made in warehouse prices. We quote universal plates and sheared plates up to 84-in., in a few weeks, at 3.919c. to 4.169c., New York, but Lloyd specification plates at 4.419c. to 5.669c. for what is available in the first half of 1917 and of plates for indefinite deliveries at 3.669c., New York. Out of store we now quote 4.75c., New York.

Bars.—Definite information is obtained of the placing of 550,000 tons of shell steel for the last half at close to 4.25c. It is probable that about 500,000 tons in addition have been put under order. The recent large-lot buying of bar iron has shown to what extent bar iron is being substituted for steel bars with its spread of $8 to $10 per ton compared with steel, and the prices are firm with some talk that an early advance, perhaps of $3 per ton, may be expected. We quote mill shipments of steel bars at 3.069c. to 3.169c., New York, the lower price for indefinite delivery and the higher price for small quantities available in 60 to 90 days and usually of discard shell steel. We quote mill shipments of bar iron at 2.669c., New York. Warehouse prices have been advanced $5 per ton for steel bars, making the base price for steel bars 3.75c., New York, and $2 per ton in the case of iron bars, which are now 3.50c., New York.

Cast-Iron Pipe.—The city of Buffalo will open bids on Friday, Dec. 1, on 2000 tons of 3 to 6-in. pipe for delivery through 1917. Private buying is in excess of the normal volume for the season. Good orders are being entered for spring delivery. An advance of $2 per ton is announced for Friday, Dec. 1. This will make the price of carload lots of 6-in., class B and heavier, $39.50 per net ton, tidewater, as they are now quoted at $37.50. Class A and gas pipe take an extra of $1 per ton.

Old Material.—The market is excited. Heavy buying is reported of practically every commodity. Consumers in eastern Pennsylvania are now scrutinizing material less severely, so that few rejections are being made, and consequently the price of steel scrap for eastern Pennsylvania shipment is more closely approximating that of railroad steel scrap or its equivalent. Italy is inquiring for steel scrap, but cost of delivery is prohibitive to dealers who do not control ocean freight room. Brokers quote buying prices about as follows to local dealers and producers, per gross ton, New York:

Heavy melting steel scrap (for eastern Pennsylvania shipment)	$19.50 to $20.00
Old steel rails (short lengths) or equivalent	21.00 to 21.50
Relaying rails	31.50 to 32.00
Rerolling rails	24.50 to 25.00
Iron and steel car axles (for export)	42.00 to 45.00
No. 1 railroad wrought	22.50 to 23.00
Wrought-iron track scrap	20.00 to 20.50
No. 1 yard wrought, long	19.50 to 20.00
Light iron (nominal)	6.00 to 6.50
Cast borings (clean)	10.00 to 10.50
Machine shop turnings	9.00 to 9.50
Mixed borings and turnings	9.00 to 9.50
Wrought pipe (not galvanized or enameled)	16.00 to 16.50

Cast scrap has not advanced as much as pig iron. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	$21.00 to $21.50
No. 2 cast (heavy)	19.50 to 20.00
Stove plate	15.50 to 16.00
Locomotive grate bars	15.50 to 16.00
Old carwheels	21.50 to 22.00
Malleable cast (railroad)	17.50 to 18.00

The Wisconsin legislative program of organized labor contemplates changes in the workmen's compensation act to increase the maximum indemnity from $3,000 to $4,000, and the minimum from $1,500 to $2,000. Old age pensions, compulsory health insurance, prohibition of night work by females and physical examinations of workers by physicians employed by the State Board of Health are other propositions to be introduced in the 1917 Legislature, which convenes in January.

British Steel Market

Pig-Iron Licenses Freer—High Grade Ferrosilicon Advanced

LONDON, ENGLAND, Nov. 29, 1916.—(*By cable*)

The pig-iron market is strong and the demand for Cleveland iron is heavy. Licenses for hematite iron are being issued more freely. Ferrosilicon, 50 per cent, is quoted at £30. Tin plate pooling arrangements are stimulating both demand and output, but deficient allotments are 42 per cent of normal capacity. Semi-finished steel is firm but quiet. Ferromanganese for second quarter delivery is quoted at £34. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 33s.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £19 5s. against £20 a week ago.

Steel ship plates, Scotch, delivered local yards, £13 17s. 6d.

Steel rails, export, f.o.b. works, £10 17s. 6d.

Hematite pig iron, f.o.b. Tees, 142s. 6d., compared with about 140s. a week ago.

Sheet bars (Welsh) delivered at works in Swansea Valley, £15 5s. nominal.

Steel bars, export f.o.b. Clyde, £18.

Ferromanganese, £34, second quarter 1917.

Ferrosilicon, 50 per cent, c.i.f., £30 against £27 last week.

St. Louis

ST. LOUIS, MO., Nov. 27, 1916.

Pig Iron.—Heavy buying of basic, for St. Louis district delivery, is reported, totaling about 75,000 tons, about two-thirds Southern and the remainder Northern. In foundry iron the transactions were both numerous and large, ranging from 2500 tons downward. A considerable tonnage of spot iron was disposed of, melters having found their needs greater than they anticipated when they placed their contracts for this period of the year.

Old Material.—The scrap market continues on its speculative career, the buying being largely by dealers who are short or who are stocking up against expected buying. The mills are buying only as their imperative needs demand, but for whatever they buy they pay the price without demur. Quite a number of dealers have been caught short. A considerable quantity of material, also, is being shipped East. Carwheels are especially strong. No lists appeared during the week. The situation is one which makes a review of the market difficult, for conditions change almost from hour to hour. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$25.00 to $25.50
Old steel rails, rerolling	25.50 to 26.00
Old steel rails, less than 3 ft.	25.50 to 26.00
Relaying rails, standard section, subject to inspection	28.00 to 30.00
Old carwheels	18.50 to 19.00
No. 1 railroad heavy melting steel scrap	22.00 to 22.50
Heavy shoveling steel	19.50 to 20.00
Ordinary shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	22.00 to 22.50
Bundled sheet scrap	12.00 to 12.50
Per Net Ton	
Iron angle bars	$23.00 to $23.50
Steel angle bars	21.50 to 22.00
Iron car axles	34.50 to 35.00
Steel car axles	35.50 to 36.00
Wrought arch bars and transoms	26.50 to 27.00
No. 1 railroad wrought	22.50 to 23.00
No. 2 railroad wrought	21.75 to 22.25
Railroad springs	22.50 to 23.00
Steel couplers and knuckles	24.00 to 25.00
Locomotive tires, 42 in. and over, smooth inside	27.50 to 28.00
No. 1 dealers' forge	19.50 to 20.00
Cast-iron borings	10.00 to 10.50
No. 1 busheling	18.50 to 19.00
No. 1 boilers, cut to sheets and rings	15.00 to 15.50
No. 1 railroad cast scrap	15.50 to 16.00
Stove plate and light cast scrap	11.00 to 11.50
Railroad malleable	15.50 to 16.00
Agricultural malleable	13.50 to 14.00
Pipes and flues	16.00 to 16.50
Heavy railroad sheet and tank scrap	15.50 to 16.00
Railroad grate bars	12.50 to 13.00
Machine shop turnings	10.50 to 11.00
Heavy machine shop turnings	12.50 to 13.00

Coke.—Spot sales were made at almost any figure representatives cared to ask. Connellsville 72-hr. coke

was quoted as high as $11.50 for immediate delivery. On by-product coke no quotations could be obtained, the local producer being out of the market and nearby producers being entirely sold up.

Finished **Iron and Steel.**—No contracts are being made, buyers keeping out of the market because of their knowledge of the situation as to deliveries. Movement out of warehouse continues heavy at advanced prices. We quote for stock from warehouse as follows: Soft steel bars, 3.65c.; iron bars, 3.55c. to 3.60c.; structural material, 3.75c.; tank plates, 4.40c.; No. 10 blue annealed sheets, 4.05c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 6.60c.

Automatic Steel Hardening and Tempering

An automatic steel hardening and tempering apparatus has been patented (U. S. 1,183,809—May 16, 1916) by Franklin D. Frisbee and Malcolm H. Baker of Boston. It involves the use of several electromagnets. A number of the thin, flat articles to be treated are arranged in a row in a receptacle, at one end of which is an electro-magnet, operating intermittently through a commutator. The magnet when energized draws one of the articles to a slot in the bottom of the receptacle, through which it drops when the current in the magnet is shut off by the commutator. The piece then falls between two heating heads faced with platinum and also constituting electromagnets controlled by the commutator. When the piece is between the heads, the heads close and compress it; at the same time heat is supplied to the heads by gas burners. After being heated a sufficient length of time, the commutator releases the piece and it drops between two other water-cooled heads, faced with silver and operated in the same way; these cool the piece. It is then dropped to a tempering head or into a tempering bath, which completes the treatment. The operation is automatic and the timing is arranged by adjusting the commutator.

Ferromanganese Imports in October

Ferromanganese imports into the United States in October were 7914 gross tons, against 9237 tons in September and 8515 tons in August. The October receipts bring the monthly average to 6289 tons for the first nine months of this year. The imports in 1915 were only 4600 tons per month. Of the October imports 2641 tons came through Philadelphia, 2657 tons through Baltimore, 1113 tons through New Orleans, 880 tons through Newport News and 623 through New York. The entire receipts were from Great Britain except 203 tons from India through New York.

An Exhaustive Study of Zinc

Recognizing that there is an insufficient knowledge of the properties of zinc, the U. S. Bureau of Standards has undertaken an investigation which it proposes to have carried out with thoroughness. Specimens have been prepared for tests of the metal in tension, torsion, transverse, cold bend, compression, shearing and hardness. Considerable progress has also been made in the investigation of testing methods for galvanized materials, which has been carried out in co-operation with the American Society for Testing Materials, several manufacturers furnishing the samples.

Locomotive Orders

Orders for locomotives in the past week were 54. The Wabash Railroad has ordered 25 Santa Fé locomotives and the Florida East Coast has ordered 10 Pacifics and two six-wheel locomotives from the American Locomotive Company. The Baldwin Locomotive Works will furnish the River Terminal railway with six small locomotives besides numerous individual orders to other customers. It is estimated that, up to and including Nov. 25, 353 locomotives were ordered of which 221 were for export.

The Pittsburgh Instrument & Machine Company, manufacturer of testing instruments, has removed from 236 Third Avenue to 101 Water Street, Pittsburgh.

Iron and Industrial Stocks

NEW YORK, Nov. 29, 1916.

Since last week's report the course of the stock market has been decidedly erratic, sharp advances alternating with equally sharp declines. Adverse influences have been the fear of international complications, indications of less ease in money available for loans and intimations that peace negotiations might begin at almost any time. The underlying strength of the speculative situation is shown by the almost immediate upward movement as soon as a rumor became stale. Steel common struck a new high point at 129¾ on Monday of this week, while Republic common on the same day touched 92⅛. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	33	- 38	Gulf States Steel, 2nd pref.	150	-180
Allis-Chal., pref.	89¼	- 91½	Harb-Walk. Refrac., com.		125
Am. Can, com.	61½	- 65½	Int. Harv. of N. J., com.	118	-125
Am. Can, pref.	113	-114	Int. Harv. Corp., com.	80	- 87½
Am. Car & Fdy., com.	71⅓	- 76½	Int. Harv. Corp., pref.		112
Am. Car & Fdy., pref.	116¾	-117⅞	La Belle Iron, com.	88½	- 94
Am. Loco., com.	88⅛	- 93¾	Lackawanna Stl.	100¼	-106
Am. Loco., pref.	108	-108½	Lake Sup. Corp.	27½	- 32½
Am. Rad., com.		425	Midvale Steel	68⅞	- 72¾
Am. Ship, com.	65	- 69	Nat. En. & Stm., com.	32½	- 35
Am. Ship, pref.		96	Nat. En. & Stm., pref.		99⅞
Am. Steel Fdries.	64⅞	- 70	N. Y. Air Brake.	175	-183½
Bald. Loco., com.	80¼	- 86	Nova Scotia Stl.	142⅝	-151½
Bald. Loco., pref.	107	-108⅝	Pitts. Steel, pref.	103¼	-103½
Beth. Steel, com.	625	-669	Pressed Stl., com.	81½	- 86⅝
Beth. Steel, pref.	155	-159	Pressed Stl., pref.		107½
Can. Car & Fdry., com.	40	- 44	Ry. Steel Spring, com.	56¾	- 61¾
Can. Car & Fdry., pref.	80	- 83	Ry. Steel Spring, pref.	102	-103¼
Carbon Stl., com.	122	-133	Republic, com.	86	- 92⅛
Case (J. I.), pref.	87⅞	- 89	Republic, pref.	115	-116
Central Fdry., com.	19	- 22	Sloss, com.	83	- 90¼
Central Fdry., pref.	37	- 41	Un. Alloy Steel	51	- 55
Chic. Pneu. Tool	72	- 75½	U. S. Pipe, com.	25	- 26½
Colo. Fuel	54¾	- 59½	U. S. Pipe, pref.	65	- 66½
Cruc. Steel, com.	83⅝	- 89⅞	U. S. Steel, com.	124½	-129¾
Cruc. Steel, pref.	122½	-123	U. S. Steel, pref.	121⅛	-122
Deere & Co., pref.	95	- 96½	Va. I., C. & Coke	62	- 69¼
Driggs-Seabury	74	- 78½	Warwick		9¾
Gen. Electric	179	-182	Westing. Elec.	62½	- 64⅞
Gt. No. Ore Cert.	44¼	- 46¾			
Gulf States Steel, 1st pref.	150	-181			
	108	-115			

Dividends

The Lackawanna Steel Company, extra 3 per cent payable Dec. 30.

The New York Air Brake Company, regular 2½ per cent quarterly dividend for next five quarters, payable in instalments and an extra dividend of 12½ per cent, payable in five quarterly instalments along with regular dividend.

The Steel Company of Canada, 4 per cent on the common stock, payable Jan. 1.

The Railway Steel Spring Company, quarterly, 1¾ per cent on common stock, payable Dec. 30; also regular quarterly dividend of 1¾ per cent on preferred stock, payable Dec. 20.

Suit Against American Steel & Wire Withdrawn

The American Steel Company, Park Building, Pittsburgh, which some time ago brought suit against the American Steel & Wire Company, in an attempt to recover damages of $750,000 under the Sherman antitrust act, on account of the defendant company's alleged monopoly in the manufacture and sale of coated wire nails, has filed a discontinuance in the Federal district court in Boston. The reason for the withdrawal of the suit was not made public.

No. 1 blast furnace of the Worth Brothers Company, Coatesville, Pa., was blown out Nov. 25 on account of the shortage of coke. Shipments delayed by the shortage of cars had resulted in the usual reserve of coke being used up. The furnace had been in operation for 17 months and will now undergo extensive repairs. It is expected to be ready to blow in about April 1.

German submarines are stated to have sunk lately three Norwegian ships carrying Narvik iron ore, which is classed as C ore and is not specified on the German contraband lists. It is high in phosphorus and Germany formerly permitted similar ore from Sydvarangar for England to pass freely.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver, pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 83.6c.; minimum carload, 36,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 50,000 lb.; structural steel and steel bars, 80c., minimum carload, 40,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 3c. to 3.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Plates.—Tank plates, ¼ in. thick, 6 in. up to 100 in. wide, 3.50c. to 5c., base, net cash, 30 days, or ½ of 1 per cent discount in 10 days, carload lots. Extras are:

Quality Extras

	Cents per lb.
Tank steel	Base
Pressing steel (not flange steel for boilers)	.10
Boiler and flange steel plates	.15
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Locomotive firebox steel	.50

Marine steel, special extras and prices on application.

Gage Extras

Rectangular, ¼ in. thick, over 6 in. wide to 100 in. wide	Base
Lighter than ¼ in., to 3/16 in., up to 72 in. wide	.10
*Lighter than ¼ in., including 3/16 in., over 72 in. to 84	.20
*Lighter than ¼ in., including 3/16 in., over 84 in. to 96	.30
*Lighter than ¼ in., including 3/16 in., over 96 in. to 100	.40
*Lighter than ¼ in., including 3/16 in., over 100 in. to 102	.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide	.15
*Lighter than 3/16 in., including No. 8, over 72 in. to 84	.25
*Lighter than 3/16 in., including No. 8, over 84 in. to 96	.35
Lighter than No. 8, including No. 10, up to 60 in. wide	.30
Lighter than No. 8, including No. 10, over 60 in. to 64	.35

Up to 72 in. and not less than 10.2 lb. per sq. ft. will be considered ¼ in.
Over 72 in. must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.
Over 72 in., ordered weight 3/16 in., take No. 8 price.
Over 72 in., ordered weight No. 8, take No. 10 price.

Width Extras

Over 100 in. to 110 in. inclusive	.05
Over 110 in. to 115 in. inclusive	.10
Over 115 in. to 120 in. inclusive	.15
Over 120 in. to 125 in. inclusive	.25
Over 125 in. to 130 in. inclusive	.50
Over 130 in.	1.00

Length Extras

Universal plates 80 ft. long up to 90 ft. long	.05
Universal plates 90 ft. long up to 100 ft. long	.10
Universal plates 100 ft. long up to 110 ft. long	.20

Cutting Extras

No charge for rectangular plates to lengths 3 ft. and over.

Lengths under 3 ft. to 2 ft. inclusive	.25
Lengths under 2 ft. to 1 ft. inclusive	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft., to 2 ft., inclusive	.55
Circles under 2 ft., to 1 ft., inclusive	.80
Circles under 1 ft.	1.85

Half circles take circle extras.

Sketches not over four straight cuts, inc. straight taper	.10
Sketches having more than four straight cuts	.20

Plates sheared to a radius take complete circle extras.

*Including extra for width.

Wire Rods.—Including chain rods, $65 to $70.

Wire Products.—Prices to jobbers effective Nov. 27: Fence wire Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $2.95; galvanized, $3.65. Galvanized barb wire and staples, $3.85; painted, $3.15. Wire nails, $3. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Cement coated nails, $2.90. Woven wire fencing, 53 per cent off list for carloads, 52 off for 1000-rod lots, 51 off for less than 1000-rod lots.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Nov. 15, 1916, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	61	34½	⅛ and ¼	50	23
½	65	50½	⅜	51	24
¾ to 3	68	54½	½	55	37
			¾ to 1½	58	42

Lap Weld

2	61	48½	1¼	44	29
2½ to 6	64	51½	1½	50	36
7 to 12	61	47½	2	51	37
13 and 14	51½	..	2½ to 4	53	40
15	49	..	4½ to 6	53	40
			7 to 12	52	39

Reamed and Drifted

1 to 3, butt	66	52½	¾ to 1½, butt	53	36
2, lap	59	46½	1¼, lap	39	23
2½ to 6, lap	62	49½	1½, lap	45	30
			2, lap	46	31
			2½ to 4, lap	49	34

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	57	39½	⅛, ¼ and ⅜	50	33
½	62	49½	½	55	42
¾ to 1½	66	53½	¾ to 1½	59	44
2 to 3	67	54½			

Lap Weld, extra strong, plain ends

2	59	47½	1¼	46	31
2½ to 4	62	50½	1½	51	37
4½ to 6	61	49½	2	53	40
7 to 8	57	43½	2½ to 4	55	43
9 to 12	52	38½	4½ to 6	54	42
			7 to 8	48	36
			9 to 12	43	31

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, freight to be added, effective from Nov. 1, 1916, except 3 to 4½ in. steel from Nov. 20, are as follows:

Lap-Welded Steel		*Standard Charcoal Iron*	
1½ in.	31	1½ in.	23
1¾ and 2 in.	43	1¾ and 2 in.	35
2¼ in.	40	2¼ in.	32
2½ and 2¾ in.	46	2½ and 2¾ in.	38
3 and 3½ in.	46	3 and 3½ in.	43
3½ to 4½ in.	46	3½ to 4¼ in.	44
5 and 6 in.	45	5 and 6 in.	37
7 to 13 in.	42	7 to 13 in.	34

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	3.75 to 4.00
Nos. 9 to 12	3.40 to 3.65
Nos. 13 and 14	3.50 to 3.75
Nos. 15 and 16	3.55 to 3.80

Box Annealed Sheets, Cold Rolled	
Nos. 17 to 21	3.80 to 4.05
Nos. 22 and 24	3.85 to 4.10
Nos. 25 and 26	3.90 to 4.15
No. 27	3.95 to 4.20
No. 28	4.00 to 4.25
No. 29	4.05 to 4.30
No. 30	4.15 to 4.40

Galvanized Sheets of Black Sheet Gage	
Nos. 10 and 11	4.50 to 5.00
Nos. 12 to 14	4.60 to 5.10
Nos. 15 and 16	4.75 to 5.25
Nos. 17 to 21	4.90 to 5.40
Nos. 22 and 24	5.05 to 5.55
Nos. 25 and 26	5.20 to 5.70
No. 27	5.25 to 5.75
No. 28	5.50 to 6.00
No. 29	5.65 to 6.15
No. 30	5.80 to 6.30

Tin Mill Black Plate	
Nos. 15 and 16	3.80 to 3.90
Nos. 17 to 21	3.85 to 3.95
Nos. 22 to 24	3.90 to 4.00
Nos. 25 to 27	3.95 to 4.05
No. 28	4.00 to 4.10
No. 29	4.05 to 4.15
No. 30	4.05 to 4.15
Nos. 30½ and 31	4.10 to 4.20

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Nov.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
22	34.00	34.00	45.62½	7.25	7.17½	12.75	12.50
23	34.00	34.00	45.50	7.25	7.17½	12.87½	12.62½
24	34.00	34.00	45.37½	7.25	7.17½	13.00	12.75
25	34.00	34.00	....	7.25	7.17½	13.00	12.75
27	34.00	34.00	45.25	7.25	7.17½	13.12½	12.87½
28	34.00	34.00	45.25	7.25	7.17½	13.25	13.00

NEW YORK, Nov. 29, 1916.

Copper is quieter but prices remain firm. Tin has been dull but the price is a shade higher. Lead has been active and more business is looked for; jobbers have been making the price for prompt and nearby, the leading interest not selling except for January. Spelter has been fairly active and, though somewhat easier yesterday, is higher. Antimony is dull but firm.

New York

Copper.—The volume of business has tapered off considerably, but prices remain strong at the top levels. Nearby metal is more scarce than ever, and this has been an influence in lessening the amount of trading. On one or two days domestic inquiry was widespread, but it cannot be learned that any large business resulted. It is generally regarded as natural that the market should be quieter after the rush to cover for all positions which had existed for weeks, and some members of the trade believe that those consumers who held off buying for the second quarter may derive an advantage from having done so. It is understood that the producers will protect regular customers at 33c. for the first quarter. Prompt December and January is held at 34c. For the second quarter 32c. might be done, although 33c. is asked by some interests for that position. The third quarter is quoted from 31c. to 31.75c. The spread is due to the fact that not a little late buying has been done quietly. Italian buyers were in the market in the past week and are understood to have closed for a tonnage which ordinarily would be considered large. The quotations for Lake are at par with those for electrolytic, with very little Lake available this side of May. In recent days a more conservative tendency has developed with regard to prices, and there is less talk of the market going higher. The dangers of a collapse are more frequently referred to, it being pointed ont that resales are not a remote possibility, also that the railroad freight situation may play a part as it did last winter. Electrolytic was quoted at £169 at London yesterday, or £6 higher than a week ago. The exports of the month are relatively light, amounting up to and including yesterday to 19,622 tons.

Tin.—Throughout the week the market has been dull. Of course there has been some business, especially in futures. On May 27, for instance, 25 tons of May shipment from the East was taken at 43.12½c. The tin-plate mills are buying their tin much as the brass mills do their copper and spelter, particularly where exports are concerned. They buy to cover a specific contract. The arrivals this month total 2230 tons and afloat there is 3392 tons. Spot Straits was quoted at New York yesterday at 45.25c.

Spelter.—Reports vary as to the amount of business done, but altogether the week was a good one. In the past two days second-hands have shown a disposition to realize profits, and sell under the quotations of the producers. The latter yesterday were asking 13.25c., St. Louis, for prompt; 13.12½c. for December, 12.87½c. to 13c. for first quarter, and 12c. to 12.25c. for second quarter, all St. Louis. On the other hand, other sellers quoted 13c., St. Louis, for prompt; 12.75c. for first quarter, and 12c. for second quarter. The New York quotation for prompt yesterday was generally about 13.25c. The producers are not so willing to sell far futures as they were a few days ago. The London spot market was quoted yesterday at £59, against £56 10s. a week previous. The exports of the month are very large, amounting, up to and including yesterday, to 13,334 tons.

Lead.—The situation in lead has been more interesting than in any other metal. The leading producer has not advanced its official quotations of 7c., New York, and 6.92½c., St. Louis, but at the same time it has been taking orders for January delivery at 7.15c., New York. At its official quotations it is not selling. There is a good demand, as yet unsatisfied, but a scarcity of lead restricts sales. Independent producers are well filled with orders. Those sales which have been made were at 7.25c. to 7.30c., New York, and 7.17½c. and upward, St. Louis. At the end of last week prompt lead was practically unobtainable. The London market for spot is unchanged at £30 10s. The exports of the month, including yesterday, total 1363 tons.

Antimony.—This metal is dull but firm at 14.50c., duty paid, for Asiatic grades. For antimony in bond 13.50c. is asked.

Aluminum.—Quotations for No. 1 virgin aluminum, 98 to 99 per cent. pure, are a little easier, at 63c. to 65c.

Old Metals.—The market is still strong and advancing. Stocks of old metal are low. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	30.50 to 33.00
Copper, heavy and wire	28.50 to 31.50
Copper, light and bottoms	25.00 to 26.50
Brass, heavy	16.50 to 19.00
Brass, light	14.50 to 15.50
Heavy machine composition	24.00 to 26.00
No. 1 yellow rod brass turnings	17.50 to 18.50
No. 1 red brass or composition turnings	19.00 to 22.00
Lead, heavy	6.625
Lead, tea	6.125
Zinc	9.00 to 10.00

Chicago

Nov. 27.—The fever of speculative buying sustains prices of copper despite the warning of producers that no shortage of the metal is at all probable. Spelter and lead prices are higher, the demand for the former being noticeably active. The lead market was comparatively quiet at the end of the week. We quote: Casting copper, 32.25c. to 32.50c.; Lake copper, 33.75c. to 34c.; tin, carloads, 45.50c., and small lots, 47.50c.; lead, 7.15c.; spelter, 12.75c.; sheet zinc, 20c.; Cookson's antimony, 50c.; other grades, 17c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 27.50c.; copper bottoms, 24c.; copper clips, 26.50c.; red brass, 23.50c.; yellow brass, 18c.; lead pipe, 6c.; zinc, 9c.; pewter, No. 1, 26c.; tinfoil, 35c.; block tin pipe, 39c.

St. Louis

Nov. 27—Non-ferrous metals have moved steadily upward, with the close to-day on lead, carload lots, 7.25c; spelter, carload lots, 12.50c to 13c. For less than carload lots the quotations are: Lead, 7.50c; spelter, 14c; Lake copper, 36c; electrolytic copper, 35.50c; antimony, Asiatic, 16.50c. In the Joplin district zinc blende took a fresh spurt upward and the range was $90 to $105, with the average for the week $95 per ton. Calamine ran from $50 to $60, with the week's average $53. Lead ore was higher, touching $90, with the average $87. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c to 8½c; heavy yellow brass, 11½c; heavy red brass and light copper, 15½c to 16c; heavy copper and copper wire, 18½c to 19c; pewter, 25c; tinfoil, 32c; zinc, 6c; lead, 5c; tea lead, 3½c.

The Pennsylvania Railroad is about to build a siding of some two miles to connect its main line with the steel plants of the Lukens Iron & Steel Company and the Worth Brothers Company at Coatesville, Pa. All freight consigned to either of these companies over the Pennsylvania Railroad now has to be transferred to the Philadelphia & Reading and delivered over the sidings of the latter company. The Philadelphia & Reading often cannot handle it, and the Pennsylvania has been compelled to place an embargo on freight to Coatesville. The building of the new siding will eliminate such troubles.

PERSONAL

James T. McCleary, secretary American Iron and Steel Institute, is to address a safety mass meeting to be held at Cooper Union, New York, on Friday evening, Dec. 1, under the joint auspices of the New York Local Council of the National Safety Council and the Peoples Institute.

Justice Grugan has resigned as manager of the Northern Ore Company's zinc operations at Edwards, St. Lawrence County, N. Y.

John I. Reid has resigned as works manager of the Thurlow plant of the American Steel Foundries, Chester, Pa., and has been made one of the sales agents of the New York office of the company at 30 Church Street.

G. Komorowski, metallurgical engineer, representing the Girod electric furnace, recently arrived in New York from France. His headquarters are with C. W. Leavitt & Co., 30 Church Street, American agents for this furnace.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., returned Nov. 22 from Norway and Sweden, after a two months' stay on professional business.

A. B. Davenport, who for some time has been filling the position of acting manager of the Driggs-Seabury Ordnance Company, Sharon, Pa., has been appointed manager, succeeding H. M. Hawkesworth, who resigned some time ago. Prior to going to Sharon, Mr. Davenport was general superintendent of William Wharton, Jr. & Co., Inc., Philadelphia.

J. F. Snarenberger, manager of the Louisville branch of the Fairbanks-Morse Company, and W. R. R. LaVielle, president W. H. Neill Company, Louisville, were the speakers at the last meeting of the Louisville Rotary Club, given over to consideration of mill supplies. A large and complete display of the items in the line was provided.

John H. Lloyd, Lebanon, Pa., will on Dec. 4 become superintendent of the Rivetless Chain & Engineering Company's plant at Avon, Pa. For the last three years he has been in charge of the turnbuckle drop-forging department of the American Iron & Steel Mfg. Company.

Gen. Otto H. Falk, president of the Allis-Chalmers Mfg. Company, Milwaukee, has been appointed chairman of the Milwaukee Abraham Lincoln Memorial Committee, which is to devise ways and means of establishing a fitting memorial for the martyred president in Milwaukee. It is planned to raise $50,000 for a monument.

Harry Scullin, president Scullin Steel Company, St. Louis, last week underwent a serious surgical operation at St. Luke's Hospital in that city. He is reported to be slowly improving.

John R. Briggs, Pottstown, Pa., has acquired the iron and steel business of Henry Potts & Co., Real Estate Trust Building, Philadelphia.

Harry Scrivens, formerly Southern representative of the Philadelphia Belting Company, Philadelphia, has been appointed sales manager.

G. C. Emmons, formerly connected with the sales department in the Pittsburgh office of the Chicago Pneumatic Tool Company, has been placed in charge of the efficiency department of the Republic Iron & Steel Company, Youngstown, Ohio, controlling the generation of heat and power for all the Republic plants in that district.

E. E. Russell has been appointed general purchasing agent of the J. I. Case Threshing Machine Company, Racine, Wis., to take effect Jan. 1. He has been with the company since 1889 and for the past 12 years has been in charge of foreign sales. Mr. Russell has served in a number of different positions in the sales and cost departments and was instrumental in opening up a number of foreign branches which led to his appointment as manager of foreign sales.

Walter F. Henly has been appointed New York representative of the Leland-Gifford Company, Worcester, Mass., which has opened a direct sales office for the New York territory in the Singer Building, 149 Broadway, New York. It already has direct sales offices in several other cities. The company manufactures high speed ball bearing sensitive drill presses, also a heavy duty sensitive drill press.

Arthur V. Farr, who for the last three years has been advertising manager of the S K F Ball Bearing Company, Hartford, Conn., has accepted the position of sales manager of the Hess Steel Corporation, Baltimore, Md.

W. J. Golden has been appointed general manager of sales for the Ferguson Steel & Iron Company, Buffalo. For the past four years he has been manager of the jobbing department of the Lackawanna Bridge Company, and prior to that was in the employment of the Railway Steel Spring Company for seven years, in the capacity of manager of its Philadelphia plant, and for some time was purchasing agent at the general offices in New York City.

Frederick R. Pettit, general purchasing agent of the J. I. Case Threshing Machine Company, Racine, Wis., has tendered his resignation, effective Jan. 1 to become vice-president of the J. I. Case Plow Works, also of Racine.

The Packard Motor Car Company, Detroit, Mich., announces several changes in its adminstrative and selling organization. H. H. Hills, sales manager, is made assistant general manager. C. R. Norton, manager of the truck sales department, is promoted to general sales manager. G. R. Bury, manager of carriage sales, is raised to assistant general sales manager. All have been with the Packard Company from seven to nine years.

Arthur E. Corbin, for the last six years assistant sales manager of the Packard Motor Car Company, has resigned, having acquired an interest in the Pluym-Ochs Company of Petrograd and New York, the largest Russian importer of American automobiles and accessories. He will leave in a few weeks for his permanent post in Petrograd. His company has American offices at 120 Broadway, New York City, and handles several well-known makes of cars and also the Curtiss aeroplanes.

The thirtieth annual meeting of the National Association of Brass Manufacturers will be held at the Hotel Astor, New York, on Wednesday and Thursday, Dec. 13 and 14. The unusual trade conditions now existing tend to make this meeting one of the most interesting and important in the history of the organization. All brass manufacturers, whether members or not, are cordially invited to attend and confer with their fellow manufacturers as to the wise course to pursue in view of the erratic course of the metal market. On the evening of the second day's session there will be a banquet and dinner, and the following have been appointed a committee to make the necessary arrangements: A. S. Hills, chairman, Haydenville, Mass.; C. C. Hale, New Haven, Conn.; C. H. Downs, Springfield, Mass. Further information as to details can be had by addressing William M. Webster, commissioner, 1818 City Hall Square Building, Chicago.

The S K F Ball Bearing Company, Hartford, Conn., has been awarded the contract for the self-aligning ball bearing hangers and pillow blocks to be used in the plant of the Courtenay Mfg. Company, Newry, S. C. The contract includes bearings for shafts ranging from 1 11/16 to 6 in. in diameter. A number of the bearings are of sizes not being made as yet at the Hartford factory and are being imported from the parent factory at Gothenburg, Sweden. The weight of the equipment specified ranges all the way from 15 lb. for the smallest hanger to 650 lb. for the largest pillow block.

Railroad Car Buying

Since Sept. 1 close to 70,000 cars have been bought and there are inquiries in the market for fully 11,000, not including more than 4000 for France and the large order expected from Russia. Last week 7500 cars were bought. Among the late awards made to the American Car & Foundry Company are 1000 stock cars for the M. K. & T., 500 box cars for the Lackawanna, 1000 box cars for the Erie, 500 ballast cars for the Denver & Rio Grande and 150 ore cars for the Bethlehem Steel Company. The Pressed Steel Car Company figures in the recent business with 1000 cars for the Wabash-Pittsburgh Terminal, 1000 box cars for the Grand Trunk, 1250 cars for the Union road of the Steel Corporation, 198 cars for Carnegie Steel Company, 300 hopper cars for the Milwaukee Coal & Gas Company, 500 hopper cars for the Lackawanna and 500 automobile cars and 150 center constructions for the Great Northern. The Haskell & Barker Car Company also looms large in recent business with 2000 box cars for the Burlington, 500 refrigerator and 500 automobile cars for the Great Northern, 1000 for the Erie and 1000 for the Illinois Central. The Ralston Car Company is to build 1250 cars for the Steel Corporation's Union road, the Standard Steel Car Company, 2000 hopper cars for the New York Central and 100 stock cars for the Atlantic Coast Line. The leading passenger car purchases include 50 for the Norfolk & Western, placed with the Harlin & Hollingsworth Company, and 25 for the Western Maryland, reported placed with the Pullman Company.

Fresh car inquiries not already noted in these columns include 1000 box cars, 200 flat cars and 300 gondolas for the Minneapolis & St. Louis; 200 caboose cars for the Pennsylvania Lines West; 2000 gondolas and 1000 box cars for the Norfolk & Western; 1300 box cars for the Denver & Rio Grande, at least so reported; 500 hoppers, as well as 750 gondolas for the Nickel Plate; 50 gondolas for the Virginian; 77 hopper cars for the Chesapeake & Ohio, and 500 to 1000 box cars and 50 to 100 tank cars, it is reported, for the St. Louis, Brownsville & Mexico.

Large Railroad Equipment Orders

Orders for cars and locomotives in the first three weeks of November have been larger than for any similar period and exceed those for any month in the last three years. The *Railway Age Gazette* says that the railroad equipment manufacturers have booked 34,908 freight cars, conservatively put at $1,500 each or $52,362,000; 256 domestic locomotives averaging about $30,000 each, or $7,680,000; 633 foreign locomotives worth conservatively $8,640,000 and 416 passenger cars at $17,000 each, or $7,027,000—a total of $75,754,000.

The second best month in three years was October, 1915, when orders were placed for 28,449 cars of which 8500 were for export. The best previous month in 1916 was October, when domestic orders were 21,034, or more than those for October, 1915. Domestic orders this year now (Nov. 25) total 123,386 cars, compared with 84,298 up to the same time last year.

Domestic orders for locomotives in three weeks of November were 256, with foreign orders for no less than 633—a total of 889. For the year thus far domestic orders have been 2386 as compared with 1023 at the same time last year or with a total of 1612 ordered in all of 1915. Foreign locomotives ordered thus far in 1916 are 1838. The locomotive builders and railroad shops of this country and Canada have ordered 4224 locomotives this year. In the first three weeks in November 416 passenger cars were ordered.

Ferrotungsten and Vanadium Exports

Ferrotungsten and tungsten metal exports for September was 40,333 lb. against 47,966 lb. in August. The total for the nine months to Oct. 1, 1916, was 96,706 lb., valued at $323,043.

Ferrovanadium exports in September were 32,289 lb. against 39,130 lb. in August. To Oct. 1, 1916, they were 1,175,729 lb. as compared with 648,863 lb. and 602,850 lb. to Oct. 1, 1915, and 1914 respectively.

OBITUARY

LIEUT. WILLIAM H. JAQUES, who recently took up his residence in High Barnet, a suburb of London, England, was killed by a railroad train Nov. 23. It is believed that he stepped from the car on the wrong side of the track and was struck by another train. He was born in Philadelphia, Dec. 24, 1848, and was graduated from the Naval Academy at Annapolis in 1867. He became lieutenant four years later, but resigned in 1887 to establish the heavy ordnance department at the works of the Bethlehem Steel Company and became its chief ordnance engineer. He served on the Coast and Geodetic Survey, was secretary of the Gun Foundry Board and of the United States Senate Committee on Ordnance and Warships, was on the jury of awards at several expositions as an expert on war materials and transportation and wrote authoritative books on torpedoes, armor and heavy artillery. Fluid compression and hydraulic forging were two of the mechanical processes he brought from Europe to the United States in his endeavor to make this Government the best equipped in the world. The scientific associations of many nations elected him to membership. He organized and for a time commanded the New Jersey Naval Reserve. At the time of his death he was president of the Holland Submarine Company.

WALTER P. NOTCUTT, for many years the representative of well-known American manufacturers in London for British and overseas trade, died Oct. 24. Among the companies represented were the Peck, Stow & Wilcox Company, Simonds Mfg. Company, Eagle Lock Company, Richmond Cedar Works, Cary Mfg. Company, Sawyer Tool Company and Smooth-On Mfg. Company and at one time the J. A. Fay & Egan Company. Mr. Notcutt also operated the Patent Tool & File Company, located near London, which manufactured special types of files for working metals. Earlier in life he spent several years in this country, having an orange grove in Southern California. The London business will be continued at 8 Whitehall Street.

HENRY POTTS, head of the firm of Henry Potts & Co., iron and steel merchants, Real Estate Trust Building, Philadelphia, died at his home in Pottstown, Pa., Nov. 3. He had been connected with the iron and steel business for many years, and through his firm had built up an extensive clientage. His activities extended into other channels of useful work, and he had an enviable reputation for probity and philanthropy. The business will be continued under the old name and will be conducted by John R. Briggs, who has for some time managed the affairs of the firm.

FRANKLIN MOREY, formerly a mining engineer and large manufacturer of mining machinery, also known as the first man to exhibit an arc light in New York City, died in St. Louis, Nov. 22, aged 85 years, at the home of his son-in-law, Clarence H. Howard, president Commonwealth Steel Company. One son, F. L., is secretary and another son, Arthur T., is general manager of the Commonwealth Company.

WILLIAM C. BRADLEY, for twenty-two years connected with the Duff Patents Company, Pittsburgh, builder of the Duff gas producers, and for some years secretary and treasurer of the company, died in Mercy Hospital, Pittsburgh, Nov. 16, aged 48 years. He leaves one son and two daughters.

WILLIAM W. HOPKINS, inventor of the Moon-Hopkins billing machine and director of the company, died in St. Louis last week. He was also an inventor of adding machines and a combination typewriter and adding machine.

WILLIAM F. MULHALL, secretary Medart Patent Pulley Company, died Nov. 21, at his home in St. Louis of heart disease, aged 50 years. He leaves his widow.

FRANCIS X. HOOPER, mechanical engineer, at one time engaged in the machinery business, died at his home in Glenarm, Md., Nov. 22, aged 63 years.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

WARRANTY OF MACHINERY.—Where it is agreed under a contract for the sale of machinery that the buyer shall be entitled to try it out before being obligated, to determine whether it conforms to the representations made by the seller, the buyer must manifest his dissatisfaction, if any, within a reasonable time, in the absence of any agreement giving him a longer trial period. And, if the contract expressly provides that, in case of dissatisfaction, the buyer shall give certain notice to the seller concerning the breach of warranty, the buyer will not be entitled to rely on a breach of warranty without first giving the specified notice, unless he can show that the seller has waived such notice. The capacity and power of an engine may be proved by an expert witness shown to possess sufficient knowledge and experience to be able to give a reliable opinion on the subject. (Texas Court of Civil Appeals, Street vs. J. I. Case Threshing Machine Company, 188 Southwestern Reporter, 725.)

MAKING MACHINERY SATISFACTORY.—A sale of machinery on condition that it will be made to work "satisfactorily" for the buyer does not entitle him to capriciously reject delivery and installation on the ground of dissatisfaction; such a contract merely binds the seller to make such installation as would satisfy a reasonable person under the circumstances. Hence, where the buyer of elevators for a building expressed dissatisfaction merely as to the controllers, but removed the elevators and installed others made by another manufacturer, he remained liable for the cost of the originally installed elevators, less the cost of substituting controllers of the kind he insisted on. (California District Court of Appeal, Bryan Elevator Company vs. Law, 160 Pacific Reporter, 170.)

LIABILITY FOR STORAGE CHARGES — UNCLAIMED FREIGHT.—The consignee of a shipment of iron beams, although not liable for demurrage charges on refusing to receive it immediately upon its arrival, is liable for reasonable storage charges incurred by the carrying railroad company pending proper disposal of the shipment, as well as for accrued transportation charges. In the absence of Federal regulation on the subject, a State law relating to the disposition of unclaimed non-perishable freight applies to interstate as well as intrastate shipments. (North Carolina Supreme Court, Norfolk & Southern Railroad Company vs. New Bern Iron Works & Supply Company, 90 Southeastern Reporter, 149.)

FREIGHT CLASSIFICATION AS DISCRIMINATION.—A carrier cannot be allowed to put junk in a car and some machinery and call it all junk; if so, the shipper who could get his machinery shipped at junk rates could always undersell one who had to pay the established rate on machinery. If shipper and carrier are allowed by agreement to vary classifications and call a commodity what it is not, the door is thrown wide open to all sorts of discriminations which are prohibited by the statutes. (South Carolina Supreme Court, Byrd vs. Atlantic Coast Line Railroad Company, 90 Southeastern Reporter, 181.)

EFFECT OF WAR ON BUSINESS CONTRACTS.—The breaking out of the European war rendered absolutely void all pre-existing and unperformed contracts between British business concerns and citizens of an enemy country; the agreements not being merely suspended until termination of the war. (United States District Court, Western District of Washington, Lindenberger Cold Storage & Canning Company vs. J. Lindenberger, 235 Federal Reporter, 542.) In this case the court cites an English decision in which it was held that the war absolutely abrogated a pre-existing contract under which a German firm had contracted to take for a term of years an English company's entire output of zinc concentrates.

CONCLUSIVENESS OF WRITTEN CONTRACTS.—Where a retail dealer ordered machines from a manufacturer under a written contract which stated that no understanding should be regarded as part of the agreement unless incorporated in writing, the dealer could not afterward set up a claim against the manufacturer on account of asserted verbal representations made by the manufacturer's representative that the manufacturer had the names of prospective customers in the locality and would assist the dealer in making sales, etc. "Assuming the agent made the representations pleaded and that they were the cause moving the defendant to sign the contract, when he did so with the clause in the contract above set forth staring him in the face, he must abide thereby." (Oklahoma Supreme Court, White Sewing Machine Company vs. McCarty Furniture Company, 160 Pacific Reporter, 495.)

SAFETY OF FOUNDRY PRACTICE.—A manufacturer is liable for injury to an employee in a foundry, caused by the falling of a heavy roller which had been stood on end on a sand floor and was jarred over by the vibrations of machinery operated in the plant, if the circumstances were such that the fall of the roller might reasonably have been foreseen. A verdict for $17,500 in favor of the injured man must, however, be reduced to $15,000 as awarding excessive damages, although he was permanently incapacitated for foundry work and so crippled that he must always use crutches; it appearing that he had previously earned 30 cents an hour. (Wisconsin Supreme Court, Adams vs. Bucyrus Company, 159 Northwestern Reporter, 722.)

UNFAIR COMPETITION IN MANUFACTURE.—A manufacturer, who places on the market machinery parts intended to replace broken or worn-out ones, specially adapted to use on machines marketed by another manufacturer who also sells such parts, is legally bound to so mark them that the public will not be deceived into believing that they were made by the manufacturer of the machine. A simulation of marks under such circumstances as to produce confusion in the public mind will be enjoined. The manufacturer of particular goods is entitled to the reputation they have acquired, and the public is entitled to the means of distinguishing them between those and other goods and to the protection against unfair dealing, whether there be a technical trademark or not. The essence of the wrong consists in the sale of the goods of one manufacturer as those of another. (United States Circuit Court of Appeals, Eighth Circuit, Moline Plow Company vs. Omaha Iron Store Company, 235 Federal Reporter, 519.)

LIABILITY CONCERNING DEFECTIVE ARTICLES.—There is a line of court decisions to the effect that a manufacturer of a thing which is apt to imperil users if negligently constructed is liable for injury resulting from defective construction, although there may have been no contractual relations with the injured person. But, in the recent case of Byers vs. Flushovalve Company, 160 New York Supplement, 1050, the New York Supreme Court refused to apply the rule to an injury resulting from the breaking of the handle of a flushing valve in a toilet. The court said: "The article in question should be held as a matter of law not to be a thing of danger within the principle stated. The difference is manifest, without any attempt at argument, between poisons and defectively made scaffolds and elevators and steam boilers and automobiles, on one hand, and such harmless things as valve handles on the other hand. It cannot be said that a valve handle is any more 'reasonably certain to place life and limb in peril when negligently made' than a broom or a shovel or any one of a thousand ordinary implements. Of course, any of those things, if negligently made, may under exceptional conditions place life or limb in peril, but that is not the test. The result must be reasonably certain, not merely possible."

A new type of public garage construction in steel frame and galvanized sheet siding has been developed by the Eslein Sheet Metal Works, 1001 Thirtieth Street, Milwaukee, as shown in a building erected for Fay L. Cusick, West Allis, Wis. The new garage is 30x120 ft. and required 15½ tons of sheet metal. Skylights and plate glass front have a total area of 675 sq. ft. The interior walls are covered with asbestos, topped with beaver-board, and the floor is of cement. Heating is by a hot air furnace. Complete repair shop equipment is provided.

The Effect of Arsenic on Brass

The question of the extent to which arsenic is detrimental to brass was taken up by C. H. Mathewson and E. M. Thalheimer in a paper before the autumn meeting of the British Institute of Metals in London in September. The authors gave the results of experiments on the annealing of three arsenical brasses containing 62.5 per cent of copper, low and high in arsenic (0.024 per cent, and 0.120 per cent, respectively), and 61 per cent of copper high in arsenic (0.139 per cent).

In the mechanical tests made after annealing and quenching at various temperatures between 450 and 750 deg. C. the arsenical brass was found superior throughout in elongation and strength. Thus, when quenched at 550 deg. C the arsenical brass gave a tensile strength of 49,400 lb. per square inch, with an elongation of 77.5 per cent in 2 in., while the corresponding figures for the other alloy were 48,300 lb. per square inch, and 74.25 per cent respectively. On the other hand, the contraction of area of the arsenical brass, after annealing at a high temperature followed by quenching, was a little the lower of the two; and in all cases the arsenical brass was the better under conditions of less sudden cooling. The alloy with the smaller percentage of copper was less sensitive than the higher alloy to variations in the rate of cooling.

The authors consider that, given proper annealing, arsenical brass is stronger and more ductile than that from electrolytic copper, and that it will stand severe hot and cold working. For brass containing 60 per cent of copper and intended for cold working they recommend that annealing at temperatures above a moderate red heat should be followed by cooling at the rate of about 20 deg. C. per minute, down to a temperature approximating 450 deg. C. Still slower cooling (50 deg. C. per minute) is advised when the proportion of copper is higher, quenching in running water being permissible when the temperature has fallen to about 550 deg. C.; but if the cooling is effected more quickly than the first-named rate it should proceed until 450 deg. C., or an even lower temperature, is attained. The results of the tests are set out in a number of tables and curves.

THE DISCUSSION

In discussing the paper Dr. Hudson rather doubted that the results would establish complete confidence in arsenical brass, for, though it was shown to give material with good tensile properties, other tests, such as the drop test, were required. The banded structure was not infrequent in copper-zinc alloys and probably depended on the size of section rolled. The prevention of zinc diffusion by the arsenic was an effect which seemed to be produced by impurities generally, nickel having a similar effect in copper-zinc-nickel alloys.

Mr. Murray regretted that the authors had not used standard alloys free from arsenic. Manufacturers at present are compelled to use brass of doubtful origin, frequently containing arsenic from mixed grades of scrap copper. He himself had found that sheets with 0.03 per cent arsenic gave better tensile results in practice than pure metal; but the results of an increase in arsenic content, due to scrap returns, had taught him to have nothing to do with arsenic. As a rapid method of detecting the presence of arsenic in brass he had found the Muntzmetal fracture test very satisfactory, cold-worked specimens in particular exhibiting a characteristic yellow fracture all over.

Professor Turner emphasized the desirability of employing shock or alternating tests and wished that that authors had tried a wider range of specimens, with an arsenic content from zero upward.

Dr. W. Rosenhain pointed out an analogy between the effects of arsenic in brass and those of phosphorus on the diffusion or solution of carbon in steel, and also drew attention to the fact that when lead and arsenic were present together they gave results differing from those produced by either singly. He thought the authors' temperature determinations were not accurate and that they had built too largely on insufficient foundations. Professor Huntington said that work on the lines adopted by the authors was very badly needed and that very numerous experiments ought to be carried out with material containing small quantities of impurities.

Aluminum Smelting Operations Near Baltimore

The Aluminum Ore Company, a subsidiary of the Aluminum Company of America, Pittsburgh, has bought a tract of 200 acres or more at Sollers Point, near Sparrows Point, Md., on which it proposes to build a plant for refining bauxite, from which aluminum is extracted. The company has maintained at East St. Louis, Ill., for some years a similar plant, obtaining the bauxite from Arkansas, Georgia and Alabama. The capacity of the new plant at Sollers Point will be much smaller than that of the plant at East St. Louis, but it will be enlarged when the demands of the company make this imperative. The new plant will be built by the engineering organization of the Aluminum Company of America, which is fully equipped to do the work. C. B. Fox, general superintendent of the East St. Louis plant, will be in regular consultation with the company's engineers in Pittsburgh during the progress of the construction work. The Sollers Point plant is expected to cost somewhat in excess of $1,000,000 and to be in operation early in 1918. The Aluminum Company of America is the largest manufacturer of pure aluminum in the world, its principal plants being located at Merryville, Tenn.; Baden, N. C.; New Kensington, Pa.; East St. Louis, Ill.; Niagara Falls and Messina, N. Y., and at Shawinigan Falls, Quebec. The last named plant is operated by the Northern Aluminum Company of Canada, an identified interest of the Aluminum Company of America. The company has several smaller plants at other locations.

New Electric Process for Brass and Copper Alloys

G. H. Clamer, of the Ajax Metal Company, Philadelphia, has patented a process (U. S. 1,198,618—Sept. 19, 1916) for making brass and copper alloys. Melted copper of the correct "pitch" is drawn off into an electric furnace. Zinc and other alloying metals are then added. Economy is claimed for this procedure because large quantities of copper are melted and brought to the proper "pitch" before entering the electric furnace; because alloying is done therein, and because the casting is accomplished at the proper temperature. The ease of regulation of the atmosphere to neutral or reducing and the simplicity with which the temperature can be controlled are claimed as important factors. Little or no zinc is reported as lost by volatilization. Large slabs may be cast, which is pointed to as a saving.

Government Tests of Steel Ingots and Rails

Progress is announced by the U. S. Bureau of Standards in the preparation of the text for the joint research with the Pennsylvania Railroad on steel ingots and their characteristics, as shown in the quality of rails made from several types and methods of manufacture. It is also stated that an investigation on rails has progressed to such a point that the reports on the Great Northern and Pennsylvania Railroad rails which have failed by transverse fissure will be finished shortly, when the chemical work is done. The completion of these reports will make possible the redesigning of the alternating stress machine for rail investigation to be pushed to completion.

Heavy Production of Benzol and Toluol

The present output of benzol and toluol in the United States is conservatively estimated at 3,500,000 gal. per month or 42,000,000 gal. per year. Of this total 3,000,000 gal. each month is benzol. When the new by-product ovens still under construction are completed the yearly output will easily exceed 50,000,000 gal. per year. Before the war this output was inconsequential in comparison.

The Matthews Iron & Mining company, Rome, Ga., has been incorporated with a capital stock of $300,000, has taken over the Silver Run furnace at Rome, and will repair and operate it. H. S. Matthews, J. W. Porter and others, Birmingham, Ala., are the incorporators.

NAVY HIT BY HIGH COSTS

Extent of the Year's Advances in Torpedoes, Shells and Metals—Expensive Labor

WASHINGTON, D. C., Nov. 28, 1916.—Some interesting disclosures concerning the increased cost of raw materials purchased by the Government during the past year and the relative cost of certain forms of war material, including torpedoes and shells, when made by the Government or purchased from private manufacturers, have been made during the past week by high naval officials in statements before the House Committee on Naval Affairs now engaged in the preparation of the annual naval appropriation bill. Some light has also been shed upon the cost of production in Government establishments as affected by the laws limiting the hours of labor, granting annual leave, etc.

METAL AND CONSTRUCTION COSTS UP

The Bureau of Steam Engineering has been hard hit by the increase in the cost of metal products of all kinds, according to Rear Admiral Griffin, chief of that bureau. Boiler plates, which the Government formerly bought for 8c. per pound, are now hard to procure at 12.4c.; copper, which the Government bought at 14c. before the war is now costing 33½c. when purchased under competitive conditions. The recently enacted law granting to all workmen in the navy yards fifteen days leave of absence annually with pay has added approximately $300,000 a year to the expenditures of the Bureau of Steam Engineering, this item amounting to upward of 5 per cent of the total payroll. Wages have also increased in all the trades employed by the bureau.

Admiral Harris, chief of the Bureau of Yards and Docks, gave some impressive testimony. The fact that the Government was in the market for an unusually large amount of material at a time when the demand for similar articles for export was unprecedented, had operated, he said, to force prices still higher and to render the big construction program additionally costly. Declaring that $3,000,000 needed for shore station maintenance would buy no more at present market prices than was purchased last year for $1,800,000, Admiral Harris explained that under the department's contracts the price of structural steel had risen from $55 to $102, with all other iron and steel products in about the same proportion. Finished equipment of all kinds, he said, had risen even more rapidly than raw material, and in this connection he cited the lowest bids the bureau has been able recently to secure on locomotive cranes at $24,000 each for machines which a year ago could be purchased for $10,000.

Rear Admiral Strauss, chief of the Bureau of Ordnance, told the committee that there had been very great advances in the cost of projectiles and other ordnance material since the last naval appropriation bill was passed; hence much more liberal estimates were submitted for the bill now being framed. Fourteen-inch shells for the big navy rifles cost 20 per cent more than last year, and until quite recently other ammunition showed proportionate increases in price. At the present time, however, the cost of small caliber shells is declining, owing, he believed, to the decreasing demand from European countries, which are now manufacturing for themselves a constantly increasing percentage of their requirements.

HIGH GOVERNMENT COSTS FOR TORPEDOES

Admiral Strauss was examined at some length as to the success of the naval gun factory in manufacturing torpedoes and stated that the first deliveries cost the Government considerably more than the price quoted by private manufacturers. This difference, he said, was due largely to the fact that operations were not yet in full swing and he predicted that the factory in the near future would get its costs down below the commercial rate. Current deliveries now cost the Government from $600 to $1,700 per torpedo more than the contract price, the exact difference depending upon the method of calculation employed. In this connection Admiral Strauss said that at the Newport station where the majority of the Navy's torpedoes are produced the cost of production was from $1,000 to $2,100 below the best price now obtainable from private manufacturers. The relatively high cost of torpedoes purchased by contract at this time, it was understood, was due to the European demand.

Several of the officials who appeared before the committee emphasized the difficulty experienced by the Government not only in obtaining material within the estimates fixed in the last naval appropriation act but within the time limits regarded by the department as reasonable. In the construction program, especially, it was stated the department had been obliged to extend delivery limits from 15 to 25 per cent in order to secure bids. Representative Butler of Pennsylvania, a member of the committee, demanded to know whether this difficulty could not be fully remedied by the adoption of a policy under which the Government would build all its own warships in the navy yards. The officials declined to indorse this proposition, however, stating frankly that the increased delivery periods were due to the difficulty of securing raw materials promptly and to the great scarcity of skilled labor of all kinds. Private concerns, it was stated, were actively competing with the Government for skilled operatives, especially in the machinery and shipwright trades, and it would be very difficult to secure adequate working forces for the construction of the entire building program in the navy yards.

W. L. C.

New Connecticut Shipbuilding Plant

The United States Steamship Company, 50 Broad Street, New York, has bought 30 acres having 2200 ft. frontage on the east bank of the Thames River near New London, Conn., as a site for a shipyard, where it will build oceangoing steel freight ships for its own use. At the start 10 ships of 6000 or 8000 tons each are planned.

The company already owns a plant at Noank, Conn., which it bought from Robert Palmer & Sons last May, and which employs 500 men. Six oceangoing freight steamships are being constructed there now. When these are completed the Noank plant will be devoted exclusively to the construction of ships for river and lake transportation, while the new plant will specialize on the building of deep sea vessels.

The United States Steamship Company was formed last December by the combination of established companies and capitalized at $25,000,000. Charles W. Morse is president.

United States Gun and Shell Bids and Awards

Contracts for furnishing 50 sets of 4-in. gun forgings, bids for which were opened Nov. 15, have been awarded as follows: The Crucible Steel Company, Pittsburgh, 10 sets; the Erie Forge Company, Erie, 20 sets; the Bethlehem Steel Company, South Bethlehem, 20 sets.

The commanding officer, Frankford Arsenal, Philadelphia, will receive proposals until Dec. 4, under proposal 236 for furnishing 13,986 4.7-in. finished, machined common steel shells.

Proposals for furnishing 57 3-in. guns and 100 3-in. mounts will be received at the Bureau of Ordnance, Navy Department, until noon Dec. 20.

The new 204-in. mill of the Lukens Iron & Steel Company, Coatesville, Pa., which when completed will be capable of rolling plates up to 192 in. wide, is expected to be ready for operation early in the new year. It is believed that this mill will be the largest of its kind in the world. The company is also building eight new open-hearth furnaces and making extensive additions to its yards, including the building of a new siding from the Philadelphia & Reading Railway. It will probably be a year before all the extensions and additions to the works are complete.

It is stated that the majority report of the commission on the Australian iron and steel industry recommends a substantial duty and the prohibition of exports of iron ore. The minority report urges the payment of a bounty.

Pittsburgh and Nearby Districts

The Brier Hill Steel Company, Youngstown, Ohio, will probably begin work shortly on the erection of an office building near its open-hearth steel plant in that city. Two other very large mill office buildings are nearly completed in the Youngstown district, one by the Carnegie Steel Company at its Ohio works, and the other by the Youngstown Sheet & Tube Company at its East Youngstown works.

The new blast furnace of the United Steel Company at Canton, Ohio, was blown in last week. It will have a daily output of 450 to 500 tons. By-product coke and benzol plants are being built, which will be completed in a short time. The new blast furnace will supply hot metal to the nearby open-hearth steel works of the United Alloys Steel Corporation.

The Purchasing Agents' Association of Pittsburgh held its annual meeting in that city last week. Robert McMillan, Pittsburgh Steel Company, was elected president; G. D. Leopold, Edgewater Steel Company, and H. G. Burns, West Penn Traction Company, vice-presidents; H. E. Harmon, Pittsburgh-Des Moines Company, secretary, and E. H. Ridgway, Colonial Steel Company, treasurer. The following directors were elected: Franklin P. Booth, city of Pittsburgh; W. P. Greer, Wheeling Corrugating Company; E. L. McGrew, Standard Underground Cable Company; C. T. Stewart, Harbison-Walker Refractories Company; J. E. Stauffer, A. M. Byers Company; R. F. Blair, Pittsburgh Gage & Supply Company; C. W. Lepper, Pittsburgh Railways Company; E. M. Scott, James H. Matthews Company; J. H. Robison, United States Bureau of Mines, and D. E. Ferguson, H. K. Porter Company.

At the Ohio works of the Carnegie Steel Company, Youngstown, one of the three new open-hearth furnaces, No. 13, has been completed and put in operation and No. 14 will be started this week. No. 15 furnace will not be ready for some time.

Pittsburgh capitalists are interested in the Pull-More Truck Company which will build a plant at New Castle, Pa. The company has placed a contract for the erection of the first unit, 100x500 ft. Among the owners of the new company are Col. H. P. Bope, vice-president Carnegie Steel Company; B. G. Follansbee, president Follansbee Bros. Company; D. M. Clemson, a director of the Carnegie Steel Company; J. W. Kinnear, a director of the Firth-Sterling Steel Company; E. M. S. Young, formerly vice-president Standard Gage Steel Company, Beaver Falls, Pa., but who resigned several months ago, and George Greer, chairman LaBelle Iron Works, Steubenville, Ohio. The Pull-More truck is a tractor-trailer. E. M. S. Young is president of the new company.

The Braddock Machine & Mfg. Company, Braddock, Pa., has been incorporated as the Braddock Mfg. Company, with a capital of $300,000 by William E. Troutman, Robert W. Tener and James L. Adams. Mr. Tener was formerly assistant treasurer of the United Engineering & Foundry Company and Mr. Troutman was general manager of that company's steel foundry department at Vandergrift, Pa. At present the Braddock Company has one 20-ton open-hearth furnace, but it is building a second furnace of the same size and will have it completed about Jan. 1, when the total output will be about 100 tons of special analysis ingots per day. Later on the company will engage in the manufacture of steel castings, with a capacity of 150 tons per day or more. The McClintic-Marshall Company is erecting an addition to the open-hearth building, which will take about 125 tons of steel.

The Driggs-Seabury Ordnance Company, Sharon, Pa., has purchased a site near its plant to be used as a proving ground, for testing new guns. Heretofore the company has sent its guns to the proving grounds of the Bethlehem Steel Company.

J. Rogers Flannery, American Vanadium Company; Col. H. P. Bope, Carnegie Steel Company; F. F. Nicola and W. S. Linderman have been appointed members of the Pittsburgh local executive committee to have charge of arrangements for the annual convention of the National Foreign Trade Council, to be held in Pittsburgh Jan. 25, 26 and 27, 1917.

The Girard Iron Company, Pittsburgh, which operates at Girard, Ohio, the largest iron puddling plant in the country, containing 88 single puddling furnaces, states that it will pay the Amalgamated Association rate for puddling for November and December, which is $9.55 per gross ton of 2240 lb., and will also give its finishers an average increase of 2½ per cent for the same period.

The Burdett Oxygen Company, with executive offices at 1401-5 Jackson Boulevard, Chicago, will complete the erection of its Pittsburgh plant, at Fortieth Street and Allegheny Valley Railroad, on Dec. 1, and will then be in a position to furnish oxygen to users in that territory. It is the eleventh plant erected by the Burdett Company in various industrial centers.

The Sistersville Boiler Works, Sistersville, W. Va., manufacturer of tanks and portable boilers, which is building a new plant with double its former capacity, has contracted for all of its equipment except a flange punch of 1-in. capacity, either new or second-hand.

Stassano Electric Furnace in Italy

The Stassano electric steel furnace is still giving in Italy excellent results in the hands of capable technical men, according to Professor Miolate, quoted in the London *Iron and Coal Trades Review*. Several are now under construction, some of which are to be substituted for other types. At Dalmine the Italian Mannesmann Tube Company has two Heroult furnaces; at Lovere (Bergamo) a Kjellin-Rodenhauser induction furnace was installed, but not having given satisfaction it has been replaced by a Stassano. The Ansaldo Company is installing a Stassano furnace; it already operates a Girod. A completely enclosed Stassano furnace is claimed to be especially suitable for making special steels, for which there is a strong demand in Italy now.

Claire Furnace Sold

The Claire Furnace Company has practically closed negotiations for the sale of its blast furnace at Sharpsville, Pa., to E. W. Mudge & Co., Frick Building, Pittsburgh, large dealers in iron ore, coal, pig iron and coke. The furnace is 75 x 16 ft., equipped with four hot blast stoves and turns out about 300 tons of pig iron per day. It is expected that the buyers will take possession of the furnace Jan. 1, and will operate it on Bessemer iron. The price paid has not been made public, but was considerably in excess of $450,000, which was the amount mentioned in Sharpsville papers. L. C. Hanna is president of the Claire Furnace Company; L. C. Hanna, Jr., vice-president, and H. M. Hanna, Jr., secretary.

New English Electric Steel Furnace

The Greaves-Etchells electric steel furnace is the name of a new type designed by two Sheffield engineers to meet the special requirements of the Sheffield steel industry, according to the London *Iron & Coal Trades Review*. Its construction has now been taken over by the Furnace Construction Company of Sheffield and a dozen such furnaces are being erected or have been contracted for and more are being negotiated for. The new furnace uses a 3-phase current but only two top electrodes.

Three of the 24 hot tin mills in the new plant of the American Sheet & Tin Plate Company at Gary, Ind., are now in operation and a fourth mill will likely be started this week. All these mills are what are known as double mills, and the 24 mills are expected to turn out about the same quantity of plate as is ordinarily rolled on 30 mills of the single type.

The Gulf States Steel Company, Birmingham, Ala., has leased Eagle furnace at Attalla, Ala., and will start it up in the spring of 1917 on basic iron, after relining. Heretofore the furnace has been operated on charcoal iron for carwheel manufacture and has produced at the rate of 18,000 tons a year.

LABOR NOTES

Numerous Employers Advance Wages and Shorten Hours

The machinists' strike in the Youngstown, Ohio, district, which has been in effect since May 1, was declared off by the strikers last week. Among the more important demands they made were an 8-hr. day; a minimum rate of 50c per hour; overtime not to be compulsory, but to be paid for at the rate of time and half-time, while for Sundays and holidays double time was to be paid. They also demanded the closed shop and other restrictions that the machine-shop operators regarded as absolutely unreasonable. Shortly after the strike started, the employers began to secure men from the outside, and were successful in doing this, the shops having been in practically full operation for some months. At the time the strike started, machinists in the district were working 54 hr. per week at an average rate of about 46c per hour, and they returned to work on Monday at this rate and also under exactly the same conditions as were in force before the strike started. However, effective on Tuesday Nov. 28, the machine shop operators in the district voluntarily gave their machinists a substantial increase in the wage rate, putting it on about the same basis as prevails in other districts. The operators will not object to hiring a machinist who belongs to a union, but no labor unions will be recognized and all shops are open.

The general advance of 10 per cent in wages announced by the United States Steel Corporation last week, to be effective on or about Dec. 15, has been followed by a similar advance by nearly all the prominent steel companies. In the Youngstown district the Republic Iron & Steel Company, Brier Hill Steel Company and Youngstown Sheet & Tube Company have notified their employees of a similar advance. The La-Belle Iron Works, Steubenville, Ohio, has taken the same action. This advance puts common labor at $2.75 per day of 10 hr., the general rate now in force being $2.50 per day. Common labor has been advanced since Jan. 1, this year, from about 19½c per hour, the general rate, to 27½c per hour.

In Alabama the Sloss-Sheffield Steel & Iron Company, Republic Iron & Steel Company, Tennessee Coal, Iron & Railroad Company and Woodward Iron Company have all raised the wages of their employees from 10 to 15 per cent in their mining departments.

Effective this week, a 10 per cent increase in the wages of all employees of the Standard Chain Company, Carlisle, Pa., is announced. In some of the departments the new order will be considered effective as of Oct. 1.

The Carpenter Steel Company, Reading, Pa., has announced a 10 per cent wage increase to all of its employees, designating this as an "emergency wage, owing to abnormal price conditions now prevailing everywhere, which increase materially the cost of living." The increase will go into effect Dec. 1.

The employees of the Eastern Steel Company, Pottsville, Pa., will receive a 10 per cent increase in wages, beginning Dec. 1.

The employees of the boiler shops at the John Wood Mfg. Company's plant in Conshohocken, Pa., will go on an 8-hr. shift, it has been decided by the company, in a short time. Heretofore the men have been working 12 hr. a day.

The Metal Trades Association in Portland, Ore., and vicinity, controlling practically all of the machine shops, foundries, pattern shops and boiler and plate shops, has decided to operate its plants on the 8-hr. day basis, beginning Dec. 1.

Newark, N. J., members of the National Founders' Association have raised the wages of their skilled mechanics from $3.75 to $4. The iron molders' union had demanded an increase to $4.25 per day. No change was made in helpers' wages.

The W. O. Hickok Mfg. Company, manufacturer of ruling machines, Harrisburg, Pa., has opened a branch of the Pennsylvania State College extension course in mechanical engineering at its plant for the benefit of its machinists and apprentices.

Pressed Hot Non-Ferrous Metal a Substitute for Castings

In a paper dealing with the problems of the brass foundry, presented at the annual meeting of the American Institute of Metals, E. A. Barnes, Fort Wayne Electric Company, Fort Wayne, Ind., stated that the problem of producing brass and aluminum parts which shall be more homogeneous, tough and perfect than can be produced by ordinary casting methods had led to the development of a pressed metal process which briefly is as follows:

A blank of copper or aluminum containing the volume of metal requisite for the finished part is heated to a fairly high temperature. This hot blank is then forced into a steel mold of the exact dimensions and design of the desired metal part, by means of hydraulic presses, giving pressures of 500 to 2000 lb. per sq. in. These pressures raise the temperature of the metal in the blank and cause it to flow into every part of the mold.

The author stated that the following results were obtained by this process: The most intricate shape can be formed, even newspaper type reproducing perfectly. The parts are formed so exactly to size and are so smooth that practically no machining is required, but where machining is necessary the metal cuts more easily than cast metal. The pressed metal parts are free from gas holes and sand, and because of this can be used for such purposes as gas nozzles, etc. Pressed metal parts are stronger than cast parts of the same metal. Pressed metal brass parts are as strong as bronze or English gun metal and can often be substituted for these.

German Foundries in 1915

The report for 1915 of the Association of German Iron Foundries, presented at a general meeting recently, says that in that year the manufacture of cast-iron shells gradually diminished in proportion to the increased use of shells made of cast or pressed steel. Owing to the shortage of labor the foundries have been obliged to employ women, foreigners and prisoners. Special praise is bestowed upon the women. Both in output and skill the results were quite unexpected. Men maimed in the war have also been employed in several foundries.

The association's scientific investigations comprised a wide field, the experiments with incased iron castings, according to Emperger's process, being especially mentioned.

The secretary in his report, dealing with the central European question and the threatened commercial war after peace is restored, expressed the opinion that a central European commercial union with preferential tariffs would be against the commercial interests of Germany and her allies and fraught with many dangers. The desired end could be better attained by suitable commercial treaties and proper arrangements as to inter-communication and money transactions.

The Machine-Tool Industry of Japan

The war has stimulated the machine-tool industry in Japan. As an example, large works containing roughly 1000 engine lathes, 300 capstan lathes and 150 drilling machines were recently completed within three months after the first orders were given out, over 90 per cent of the machines being made in Japan. Jigs and fixtures are not used to any great extent and as most of the works will accept any order that comes to them within their capacity there is little opportunity for specialization. In an article in the *Monthly Review* (British) it is pointed out that only within the last ten years or so has Japan taken up the manufacture of machine tools seriously. Little progress was made until about four years ago, when the government decided that it was time to encourage domestic manufacture so as to check the flow of specie abroad and make Japan's markets less dependent on foreign supplies.

Machinery Markets and News of the Works

RAILROADS MORE ACTIVE

Pacific Coast Shipyards Notable Buyers

Higher Costs Preclude Reduction of Machine-Tool Prices and May Cause Advances—Needs Should Be Anticipated

As noted in the New York market various of the railroads are showing more interest in machine tools, at least four of the lines being in the market to some degree. For some time they have been active in the matter of rolling stock, bridges and track materials, and it is but natural that they should also consider equipment for their shops.

The shipbuilders have been active buyers, also, some large orders having been placed in the East by the Pacific coast interests. The New York market shows a gain in activity when all types of machines are considered.

From Cincinnati comes the suggestion that there can be no reduction of machine-tool prices so long as the cost of materials continues at its present high and advancing level. In this direction the greatly advanced cost of pig iron is having a tangible effect and will have more when existing contracts for castings expire. The domestic inquiry in Cincinnati has improved considerably, but actual orders are somewhat slow in closing. Spanish and Italian inquiries are before the trade.

In Cleveland the inquiry for stamping equipment is particularly good, otherwise a quieter trend is noticed. Long deliveries tend to make some purchasers slow in closing, although this effect is not felt in some other parts of the country. In New York, for instance, orders are being placed in a lively way despite the long deliveries.

Business is excellent in Detroit, and is expected to increase when the automobile makers begin to buy more actively to prepare their plants for the rush of spring business. It is urged that prospective buyers should anticipate their wants as much as possible and thereby get needed tools at work as soon as can be done.

In Milwaukee orders are being booked in such steady volume that all available capacity will soon be engaged to the end of 1917. Buyers in that city are more concerned with the question of when deliveries can be made than with the prices they are asked to pay.

New York

NEW YORK, Nov. 29, 1916.

The market is more active, with practically all types of tools in demand. Long deliveries have not deterred purchasers from placing some attractive orders, and it is pleasing to note that they are willing to wait rather than take tools which would suffer from too hurried building. Good buyers, for instance, are willing to wait for castings to become properly seasoned. Most of the buying continues of a miscellaneous character and comes from many directions.

The railroads are showing more life with regard to machine tools. The Norfolk & Western has not begun to purchase yet, but the Lehigh Valley continues to place orders. The Baltimore & Ohio has been buying odd tools recently, and the New York, New Haven & Hartford is buying general equipment for its roundhouses.

A large amount of business has been placed by the shipyards. The value of the machinery bought by the Pusey & Jones Company, Wilmington, Del., is close to $100,000. Representatives of the Ames Shipbuilding & Dry Dock Company, Seattle, Wash., have been in the East and have contracted heavily for shipyard equipment. The company was recently incorporated with a capital stock of $800,000. It has contracts for three steamships.

The Fabrica Italiana Automobil Torino, Poughkeepsie, N. Y. (Fiat Company), has recently ordered two flat top turret lathes and is in the market for other equipment.

The Himoff Machine Company, 126 Mott Street, New York, which builds a high-duty manufacturing lathe, has lately bought tools to enlarge its facilities.

The Jersey Forging Works, Jersey Avenue and Sixteenth Street, Jersey City, N. J., incorporated recently with a capital stock of $100,000, has erected a plant, 100 x 150 ft., in which it has installed one 3500-lb. hammer and one 1000-lb. hammer and expects to add other new hammers soon. It is equipped to produce crankshafts, gear blanks, columns and heavy and light forged work, general blacksmith work, tie rods, eye bolts and special bolt work. The incorporators are Charles A. Kruse of Chicago; Benjamin Farrier and Charles E. Hendrickson, of Jersey City. Mr. Kruse has been identified with the forging industry for many years. Charles A. Kruse is president.

The new corporate style, the Interstate Machine Products Company, has been adopted by the former Interstate Machine Company, Rochester, N. Y.

The Samuel L. Morse & Sons Corporation, Elizabethport, N. J., is having bids taken through its architects, Ring, Cleaves, Graham Company, 280 North Broad Street, Elizabeth, N. J., for a one-story foundry addition, 40 x 200 ft., to cost about $20,000.

The Norma Company of America, manufacturer of ball and roller bearings, precision testing instruments, etc., 1790 Broadway, New York, has increased its capital stock from $100,000 to $300,000, preliminary to the expansion of its business. W. M. Nones is president.

The Buffalo Foundry & Machine Company, maker of steam hammers, Buffalo, N. Y., expects to build a three-story pattern addition, 52 x 140 ft., of brick and concrete, which will double its present pattern storage space. The company broke ground Nov. 23 for a new laboratory building, 75 x 90 ft., of brick and concrete, to contain its chemical and physical laboratories, used in connection with the foundry, also its laboratory and testing plant used in connection with its vacuum drying business.

The Davis-Bournonville Company, manufacturer of oxy-acetylene and oxy-hydrogen welding and cutting apparatus, Jersey City, N. J., has authorized an increase in its capital stock from $170,000 to $370,000. Only a portion of the stock is to be issued at the present time. The company has very materially increased its output in the past two years and has only recently completed an additional factory building with approximately 35,000 sq. ft. of floor space. It is now still further increasing its manufacturing facilities with two additional stories on the new building with the expectation of occupying the added stories soon after Jan. 1.

The corporate name of the Houk Mfg. Company, manufacturer of wire wheels, Buffalo, N. Y., recently acquired by the United Motors Corporation of Detroit, will be changed to the Houk Wire Wheel Company, which will be capitalized at about $4,000,000. Approximately $1,000,000 will be spent for increasing the company's buildings and equipment. Plans in progress call for two factory buildings, 60 x 300 and 50 x 150 ft., to be added to its plant at Elmwood Avenue and the New York Central Railroad.

Plans for the new factory of the Harrison Mfg. Company, Lockport, manufacturer of motor trucks and parts, will be 163 x 396 ft., two stories, estimated to cost $250,000.

The Crown Metal Construction Company, Jamestown, N. Y., will soon award contract for erection of a one-story plant.

The Diehl Mfg. Company, Elizabeth, N. J., manufacturer of electrical fans and motors, is removing its plant from Newark Avenue to property adjoining the Singer Mfg. Company, Trumbull Street, Elizabethport, N. J. The Newark

Avenue factory, recently sold to Woodward & Co., will be occupied by the Thurlow Steel Works.

The Hagerstrom & Chapman Company, Newark, N. J., manufacturing jeweler, will build a new two-story brick factory at 9 Orchard Street, to cost about $10,000.

Maher & Flockhart, 60 Polk Street, Newark, N. J., makers of special castings, will make alterations and improvements in their foundry, to cost about $3,000.

The Brunswick Motor Car Company, Newark, N. J., has acquired property at Avenue B and Miller Street, and will establish a plant for the manufacture of automobiles. Russel Smith is president and Alden V. Meeks, New York City, is treasurer.

The Standard Oil Company has awarded a contract for the erection of a two-story and basement service plant and garage, 72 x 91 ft., at 94 Ogden Street, Newark, N. J., to cost $60,000. The H. D. Best Company, 52 Vanderbilt Avenue, New York, is the contractor.

William A. McManus and Frederick A. Hagner, Newark, N. J., have incorporated in Delaware the General Safety Signal Company, with capital stock of $500,000, to manufacture safety signal devices for street cars and automobiles. Charles F. Burroughs, East Orange, N. J., is also active in the company.

The Simplex Instrument Company, Newark, N. J., has been incorporated with a capital stock of $125,000 to manufacture hydrometers, thermometers, battery meters, etc. Frederick Beck and R. G. Higgins, Newark, and Edward W. McDonough, Orange, N. J., are the incorporators.

The Columbus Crystal Company, Newark, N. J., will build a one-story addition, 50 x 184 ft., on Avenue R, near the Central Railroad of New Jersey, to cost $10,000.

The Balbach Smelting & Refining Company, Newark, N. J., will build a one-story addition to its plant, about 40 x 100 ft., at Stockton and Delancy streets.

The Best Hold Fastener Company, Newark, N. J., has been incorporated with a capital of $100,000 to manufacture fastening machines. W. S. Bechtold, Herman F. Behrendt, G. H. Schumacker and Frederick Wilke, all of Newark, are the incorporators.

The Fieldler Corporation, Newark, N. J., has filed plans for a garage to be erected at 524 Broad Street at a cost of $25,000.

Michael J. Kearny, Hoboken, N. J., will build a one-story copper works building at 1102 Clinton Street, at a cost of about $12,000.

The Elevator Supplies Company, 1503 Willow Avenue, Hoboken, N. J., has been incorporated with a capital of $2,000,000 to manufacture elevator supplies and specialties. Edward A. Markley, 144 Erie Street, Jersey City, Ralph E. Cooper, 239 Parker Street, Newark, and John H. Young, 318 Forrest Street, Jersey City, are the incorporators.

The Durstan Gear Company, Maltbie Street, Syracuse, N. Y., has let contract for the erection of a one-story factory, 50 x 108 ft.

The Bennett Corporation, Sietz Building, Syracuse, N. Y., will build a cement plant, comprising three buildings, at Phelps, N. Y., estimated to cost $1,250,000. Plans are in preparation. J. W. Bennett is president.

The Taylor Instrument Company, 95 Ames Street, Rochester, has let contract for erection of an addition to its laboratory, 30 x 120 ft.

The D. & W. Machine Company, Mount Vernon, N. Y., has been incorporated to manufacture machinery, tools, hardware, etc. H. N. Kelly, R. G. Chase and A. L. King, 431 Homestead Avenue, are the incorporators.

The H. W. Johns-Manville Company, Madison Avenue and Forty-first Street, New York, will build a six-story factory addition, 100 x 200 ft., at New Rochelle, N. Y., for the Jones Speedometer Company, lessee, 32 Thirty-third Street, Brooklyn, N. Y.

The American Radiator Company, Buffalo, has let contract for erection of a one-story addition, 80 x 100 ft., to the malleable iron foundry at its plant at Elmwood Avenue and the New York Central Railroad.

Hart & Crouse, Utica, N. Y., are preparing plans for a core shop, 100 x 150 ft., which they will erect at once.

The Elmira Foundry Company, Elmira, N. Y., has been incorporated with a capital stock of $95,000 and will establish a foundry and machine shop. H. C. Mandeville, A. P. Morrow and F. Levalley, 216 West Ray Street, are the incorporators.

The Batavia Specialty Company, Batavia, N. Y., manufacturer of tin boxes, is erecting an addition to its new plant on Harvester Street.

The Delano Self Starter Company, Plandome, N. Y., has been incorporated with a capitalization of $250,000 to manufacture accessories for motor vehicles. E. Buchignani, W. Webster and C. Adams are the incorporators.

The Buffalo Sled Company, North Tonawanda, N. Y., J. J. Snyder, president, has had plans completed for a factory and warehouse to cost approximately $150,000, to be added to its plant at Schenck Street and the Erie Railroad.

Plans have been completed for a factory to be erected on a plot of 130 x 200 ft. at Ingraham Street and Garden Avenue, Brooklyn, for the Greenpoint Metal Covered Door Company. Shampan & Shampan, 772 Broadway, Brooklyn, are the architects.

Henry Burkhardt, 246 St. Nicholas Avenue, Brooklyn, N. Y., is taking bids for a one-story brick ice manufacturing plant, 26 x 125 ft., to be erected at Proctor Street and Edsall Avenue, from plans by Albert F. Thielman, 45 East Forty-second Street, New York, at an estimated cost of $30,000.

The Rand Company, North Tonawanda, N. Y., manufacturer of bank and office equipment, is having revised plans drawn for factory addition, 67 x 102 ft., three stories and basement.

Philadelphia

PHILADELPHIA, PA., Nov. 27, 1916.

A marked relief in the shortage of freight cars, according to officials of the Pennsylvania and the Philadelphia & Reading railroads, has been effected in the last fortnight by business firms and individuals in Philadelphia co-operating with the carriers by prompt unloading. The chief causes for car shortages affecting the railroads terminating here are due primarily to the large amount of equipment tied up at the Great Lake ports, where the coal movement is always extremely heavy just before the lakes are closed to traffic. The heavy amount of ore awaiting haulage to the steel-making centers is likewise carrying cars in this direction. Combined with congestion at tidewater these factors were responsible for the car shortage reaching an acute stage. In comparison with a period of more than a year of freight moving eastward almost wholly, local carriers are experiencing a strong improvement in westward-bound freight.

The S. A. Ashman & Son Company, machinist and manufacturer of forgings, 2300 East Tioga Street, Philadelphia, will make very extensive improvements to its plant. It will erect a new building to contain machinery for extending its forging business in certain lines and will also install a new power plant. In connection with this it will enlarge its capacity for the manufacture of rings and the forging and handling of special tool steel and alloy steel. William W. Sketchley is secretary and treasurer.

The Crescent Ice & Coal Company, Philadelphia, has awarded a contract for the erection of a one-story ice plant, 56 x 225 ft., at Twenty-fifth and Tasker streets, to cost $20,000.

The Victor Motors Company, Philadelphia, recently incorporated with a capital of $2,000,000, has acquired the former plant of the Wharton Switch Works, Jenkintown, Pa., comprising eight buildings and about 25 acres of land, for its initial automobile manufacturing plant. The former plans of the company to build a plant at Grubbs Landing, near Claymont, Del., it is stated, have been abandoned.

The Royal Pioneer Box Company, Philadelphia, has awarded a contract for the erection of a new factory at 934 North Third Street, at a cost of $10,000. The James Levin Company, 1530 South Sixth Street, is the contractor.

The Packard Motor Car Company, Philadelphia, has awarded a contract to Cramp & Co. for the erection of an eight-story steel and concrete service plant, 70 x 185 ft., at Broad and Wood streets.

The Glenwood Avenue Garage, Trenton, N. J., will build a two-story addition, 60 x 110 ft., at Glenwood Avenue and Chambers Street, to cost about $12,000. The capacity of the repair plant will be increased by the installation of new equipment; a gasoline engine for light and power service will also be installed. E. C. Bowers is the proprietor.

C. V. Hill & Son, Trenton, N. J., manufacturers of refrigerators, will build a one-story brick addition to their plant at Chelton Avenue, to cost about $4,000.

The Modern Aeros Corporation, Ltd., Broad Street Bank Building, Trenton, N. J., has been incorporated with a capital of $100,000 to manufacture motors and engines of compressed air and gas types. Joseph Pedery, Lazar Lukacs and Armand W. Allyn are the incorporators.

The Sun Shipbuilding Company, Chester, Pa., has awarded a contract for the erection of five new one and two-story, reinforced-concrete additions to its plant to Barclay White & Co., Philadelphia, at a cost of $120,000.

The Philadelphia & Reading Railroad, Philadelphia, will

build an addition to its locomotive shop and foundry at Reading, Pa. Samuel T. Wagner is the architect.

The Bradley Pulverizer Company, Allentown, Pa., has acquired a section of the former property of the Allentown Foundry Company, 300 x 500 ft., as a site for an additional plant for the manufacture of pulverizing and grinding machinery.

The plant of the Duplex Metallic Company, Conshohocken, Pa., it is reported, is ready for operation, and it is expected that it will be started in a few days.

A contract for the erection of an addition, 20 x 105 ft., to the Columbus Chain Company's plant, Lebanon, Pa., has been awarded. It will be used for the installation of three new furnaces for the manufacture of big link chain.

The Office Appliance Company, Williamsport, has been chartered with a capital of $5,000 by Thomas G. Ward and Henry W. Pyles, Williamsport, and George M. Wilson, Montoursville, to manufacture metal office appliances.

Notice of authority to increase its capital stock from $10,000 to $500,000 has been filed by the Progressive Wire Goods Company, 528 Commerce Street, Philadelphia.

The plant of the Beach Mfg. Company, Montrose, Pa., manufacturers of sawmill and woodworking machinery, was destroyed by fire last week. The company took steps to replace their building and equipment before the ruins were cold. Despite the shortage of spot machine tools they managed to locate a number which were shipped to them immediately.

Notice of authority to increase its indebtedness by $42,000 has been filed by the American Metal Works, Armat and Heiskel streets, Philadelphia.

Pittsburgh

PITTSBURGH, PA., Nov. 27, 1916.

Manufacturers and dealers in this district continue to report a heavy demand for machine tools of all kinds, and state they are able to make better deliveries than were possible three or four months ago. Some of the larger machine-tool builders in New England have caught up to some extent on orders and are able to ship out more promptly. High prices continue to rule, but no marked advances in prices on machine tools have been made for some time. The Carnegie Steel Company, Pittsburgh, sent out recently a list of machine tools for delivery at Clairton, Pa., where it is building a very large number of by-product coke ovens and in connection with which large machine shops will be built. The list, on which no purchases are said to have been made as yet, includes the following tools, all motor-driven, Westinghouse or General Electric types preferred:

One 16-in. x 4-ft. geared head engine lathe, with quick change gears, complete.

One 20-in. x 10-ft. geared head engine lathe, with taper attachment.

One 42-in. x 24-ft. geared head engine lathe, with quick change gear and taper attachment.

Three 24-in. crank shaping machines, complete, with extension base.

Two 3-ft. radial drilling machines.

One 6-ft. radial drilling machine, with tapping attachment.

One 5-ft. boring mill.

One No. 4 universal milling machine.

One 4-ft. x 14-ft. planing machine, open side type, two heads on cross rail and one on side, complete.

Two 20-in. radial drilling machines.

One 3-in. bolt cutter.

One No. 4 Keyseating machine.

One emery grinding machine, with two 18-in. x 3-in. wheels, complete, with guards, speed control and starter.

One emery grinding machine, with two 12-in. x 2-in. wheels, complete, with guards, speed control and starter.

One hack saw, capacity up to 6-in. square.

One No. 3 pipe cutting and threading machine, one No. 6 pipe cutting and threading machine, one No. 8 pipe cutting and threading machine, all three complete with pumps, dies, cutting-off tools, length gages, etc.

One 60-in. gear cutting machine.

The Carnegie Steel Company is also in the market for a 6 x 6-in. angle shear, and a 6 x 1½-in. bar shear, this equipment presumably being for delivery in McDonald, Ohio, where its new bar and angle mills are being built.

New England

BOSTON, MASS., Nov. 27, 1916.

The Chase Metal Works, Waterbury, Conn., is to build at once a factory, 100 x 400 ft., two stories. It will also build an addition to an existing building, 61 x 202 ft., one story.

The Mansfield Foundry Company, Mansfield, Mass., which recently acquired the Rider Foundry property, has started an addition to the latter plant, 60 x 100 ft.

The East Deering Foundry Company, East Deering, Me., a new corporation, has plans for a foundry, 40 x 100 ft.

The M-B Tool Company, Providence, R. I., has been incorporated with capital stock of $50,000 by Louis B. Massicotte, Robert D. Banigan and John J. Banigan.

The E. W. Carpenter Mfg. Company, Bridgeport, Conn., has been incorporated with capital stock of $50,000 by Jonathan Grout, Philo C. Calhoun and J. Walter Scheffer, to manufacture tools.

The Stamford Rolling Mills Company, Stamford, Conn., is building an addition, 37 x 321 ft., and a new casting shop, 62 x 128 ft., at its Fairfield Avenue plant.

The Terry Steam Turbine Company, Hartford, Conn., is making an addition to its stock room, 20 x 125 ft.

The General Mfg. Company, Waterbury, Conn., has awarded the contract for its new plant, 40 x 98 ft., four stories, and a wing, 25 x 60 ft., one story.

The Deane Steam Pump Company, Holyoke, Mass., is reported to be having plans prepared for extensive additions to its plant.

The Granite State Tap & Die Company, Boston, Mass., has been incorporated with capital stock of $200,000. The directors are Walter T. Harrison, president; Charles F. Remington, Charlestown, N. H., treasurer, and L. M. Dunn.

The Quick Lock Demountable Rim Company, Boston, Mass., has been incorporated with capital stock of $50,000. James Norrie is president and Charles F. Crowell, 22 Ames Building, Boston, treasurer.

Baltimore

BALTIMORE, MD., Nov. 27, 1916.

Announcement has been made that the Mutual Chemical Company of America, 1348 Block Street, Baltimore, has purchased over 11 acres at St. Helena, Md., and will construct a by-product plant. The property has 510 ft. of waterfront.

The Continental Can Company, 1002 Keyser Building, Baltimore, has awarded a contract for the construction of a three-story factory, 100 x 300 ft., at Highlandtown, Md., to cost between $80,000 and $100,000.

The Maryland Brass & Metal Works, Guilford Avenue and Federal Street, Baltimore, will build an addition, 19 x 60 ft.

The American Ice Company, 309 Calvert Building, Baltimore, will construct a one-story addition, 27 x 130 ft., to its plant at Montford Avenue and Chase Street.

A plant to cost over $400,000 will be built at Norfolk, Va., by the Virginia Navigation Coal Company.

The Abingdon Utilities Company, Abingdon, Va., has been incorporated with $100,000 capital stock and plans are being prepared to build an electric plant.

The Black & Decker Mfg. Company, manufaccurer of machinery, 105 to 115 South Calvert Street, Baltimore, has purchased a 10-acre tract at Towson, Md. Duncan Black, president, states that no plans have been made as yet. The company employs about 125 men.

Deibert Brothers, Elkton, Md., are said to be planning the establishment of a plant at Havre de Grace, Md., to build barges. Contracts for two barges are understood to be in hand.

The Baltimore Enamel & Novelty Company, Woodall Street, Baltimore, has asked bids on a one-story factory, 250 x 580 ft., to be built at Westport, Md.

Harry G. Skinner, 1414 Continental Building, Baltimore, formerly associated with the Skinner Drydocks Company, is understood to hold an option on 29 acres on the Elizabeth River at Berkley, Va., for a company which will be capitalized at $2,000,000 to build and repair ships. Ample room is available for two floating drydocks, repair shops, etc.

The Berrethal Machine Company, Moore Street, Suffolk, Va., has awarded contract to Wills & Co. for the construction of a one-story foundry, 62 x 72 ft. J. E. Benthal is the proprietor.

Chicago

CHICAGO, ILL., Nov. 27, 1916.

D. J. Hauptman, 139 North Clark Street, Chicago, will erect a one-story foundry at 1738 North Kolmar Avenue, to cost $15,000.

William H. Barry, 1910 Lakewood Avenue, Chicago, has let contract for a one-story factory building, 161 x 246 ft., to be erected at 5027 South Wabash Avenue at a cost of $35,000. E. J. Ohrenstein & Hield, 105 South Dearborn Street, are the architects.

Robert Glendinning, president, Patent Vulcanite Roofing Company, 2256 West Forty-ninth Street, Chicago, will erect a three-story factory, 30 x 100 ft., at West Forty-eighth Street and Campbell Avenue, to cost $15,000. Arthur Foster, 230 South La Salle Street, is the architect.

S. N. Crowen, 30 North La Salle Street, Chicago, is the architect for a one-story manufacturing building, 99 x 125 ft., to be erected at 309-19 St. John Court, for J. J. Harrington, 38 South Dearborn Street.

H. C. Evans & Co., 75 West Van Buren Street, Chicago, will build a two-story toy factory, 75 x 125 ft., at 1524-28 West Adams Street, which will cost $40,000.

The Clemetson Company, 2607 Flournoy Street, Chicago, will erect a factory at West Division Street and Homan Avenue, consisting of a main building, three stories, 75 x 276 ft, a kiln, 30 x 35 ft., and a power house, 40 x 65 ft., etc., of reinforced concrete. Webster Tomlinson, 64 East Van Buren Street, is the architect.

The Chicago Engineering & Machine Works, Chicago, has increased its capital from $2,500 to $25,000.

The Mackemer Motor Car Company is planning to erect a garage, 48 x 185 ft., on property recently purchased at Canton, Ill. The building will be of brick and concrete and will have full modern equipment.

The Hutchinson Foundry & Machinery Company, Hutchinson, Kan., has plans for a new foundry, 100 x 300 ft.

The Southern Iowa Machinery Company, Centerville, Iowa, has acquired the Goss foundry and machine shop, which will be enlarged and new equipment installed.

The Seaton Foundry Company, Atchison, Kan., will erect a one-story foundry, 100 x 275 ft.

The Jackson Compressor Company, Denver, Col., has started work on a machinery manufacturing plant at Alameda Avenue and Cherokee Street to cost $200,000.

The Crown Tire & Rubber Company, Omaha, Neb., is about to start the building of the first unit of a tire and rubber plant, for which 5 acres has been purchased in a manufacturing suburb of Omaha. The factory will have a full line of rubber machinery, and the product will be manufactured from the crude materials. The company will be in the market for machinery to produce about 300 tires and 250 tubes daily. It is planned to have the building up and machinery installed about Aug. 1 next. An output of 50 tires a day, both cord and fabric types, will be undertaken in a temporary location which has been sceured nearby. H. A. Reichenbach is president.

The Hart-Parr Company, Charles City, Iowa, has started the erection of a steel foundry to cost about $100,000 equipped.

Milwaukee

MILWAUKEE, WIS., Nov. 27, 1916.

Business is being booked by machine-tool builders in such steady volume that all available capacity will probably be filled from now until the end of 1917. From the demands upon the general metal-working industry, manufacturers of machinery and equipment are finding no relief from the pressure upon their facilities. Lines of production that have been comparatively dormant for several years have been reviving, because of the broader demand. High prices do not appear to have any considerable effect. It seems to be a question merely of when deliveries can be had, rather than what the price will be. An instance of delivery conditions is reported by a large milling machine interest which received a telegraphic order the past week from California for three standard tools. The company accepted the order for April 15 or May 1 delivery.

Important changes in the organization of the Giddings & Lewis Mfg. Company, Fond du Lac, Wis., manufacturer of machine tools and sawmill machinery, have just been made public. The controlling interest has passed from C. E. Cleveland, president, and Henry Rueping, secretary and treasurer, to the Fred Rueping Estate, which has appointed as general manager M. M. Cory, Chicago, until now associated with the Concrete Steel Company. Work is under way on a new pattern shop, 30 x 60 ft., and an administration building, 40 x 40 ft., two stories and basement. The space thus released will be used for shop purposes. Later a shop addition will be erected. The company has been working 23 hr. a day for several months and employs 346 machinists. Large orders for multiple spindle lathes are being filled, and enough business is available to keep the works operating to capacity until well into 1917, were no new orders booked. The company originally was organized as Giddings, Delfroat & Lewis. In 1887 Mr. Cleveland purchased an interest. It was incorporated under its present name in 1900, with $200,000 capital. George Giddings sold his interest in 1904. Mr. Cleveland became president and Mr. Rueping secretary and treasurer. Both now retire from active business.

Wausau, Wis., will soon be in the market for a centrifugal pumping unit to cost between $1,250 and $1,500.

The Marathon Electric Company, Wausau, Wis., is building an addition to its factory, 40 x 50 ft., and will install some new equipment, which will double the capacity.

A. L. Allen, Brodhead, Wis., has purchased the Broderick machine shop and will remodel part of it into a garage, devoting the remainder to shop purposes.

The John Obenberger Forge Company, Milwaukee, has increased its capital stock from $125,000 to $160,000. It now has its new plant in West Allis in operation and is making deliveries of drop forgings. The additional stock issue is made to accommodate its increased activities.

The Northwestern Motor Company, Eau Claire, Wis., Kim Rosholt, president and chief engineer, maker of gasoline-propelled railroad cars, has contracted with the Northwestern Steel & Iron Company, Eau Claire, for the manufacture of its entire line of products, including four new types, namely, light speed car for inspectors; a standard section and track maintenance car; a special chair car for officials, and a 15-passenger coach. The Eau Claire Mfg. Company has taken sub-contracts for part of the work and has started production on 250 cars. The Northwestern Motor Company has marketed about 6000 cars since it started four years ago.

Soderstrom & Anderson, Ogema, Wis., machinists and blacksmiths, are building a new shop, 40 x 60 ft., to be ready Feb. 1.

The Kempsmith Mfg. Company, Milwaukee, maker of milling machines, reports that it is steadily booking small orders from all over the country and that present orders will keep the plant fully occupied throughout 1917. During the week the company received a telegraphic order from California for three standard tools for rush shipment; but because of the sold-up condition of the shop, will not be able to make delivery before April or May.

Logemann Brothers, 3130 Burleigh Street, Milwaukee, manufacturers of baling presses, etc., will break ground Dec. 1 for another addition to its shops, 50 x 75 ft.

The Gillette Safety Tire Company, Eau Claire, Wis., which is about to commence operations in its new factory, is increasing its capital stock to $1,000,000, Eastern capital having taken an interest. It is planned to erect a new unit this winter, duplicating the present plant, to handle export orders for commercial rubber goods. R. B. Gillette is general manager.

The Wisconsin Aluminum Foundry Company, Sixteenth and Franklin streets, Manitowoc, Wis., has established a welding shop, and will do a commercial business in cutting and welding metals.

Articles of incorporation have been filed in behalf of the LaPoint Foundry Company, Milwaukee, capitalized at $5,000 by Robert and Catherine LaPoint and Frank B. Burke. It will operate the plant of the Standard Machinery Company, Schleisingerville, Wis., recently purchased by Robert LaPoint. The company manufactures gasoline engines and farm machinery and operates a gray-iron and brass foundry.

The Chippewa Foundry & Machine Company, Chippewa Falls, Wis., finished construction work on its new main shop, Nov. 25, and is installing machinery and other equipment. The shop will have a capacity of 40 small pumps and 2 to 4 large pumps daily.

The Ladewig & Stock Company, Waukesha, Wis., manufacturer of brewers' and bottlers' machinery, is reported negotiating for a factory site at Madison and Anne streets, for its proposed new plant.

The Badger Malleable & Mfg. Company, South Milwaukee, Wis., has amended its articles to provide for an increase in the capital stock from $100,000 to $200,000.

The Turbine Sewer Machine Renovating Company, Eleventh and Wells streets, Milwaukee, has changed its corporate style to the Turbine Sewer Machine Company.

The Phoenix Chair Company, Sheboygan, Wis., is contemplating some changes in its power plant, which include the installation of a 200-hp. simple Corliss engine, 120-lb. steam pressure; must be right hand. It is also considering

the installation of a 500-kva., 220-volt, 60-cycle, three-phase generator, direct connected to a Corliss engine.

The Diamond Match Company has plans for the enlargement of its plant at Oshkosh, Wis.

The Winther Motor Truck Compay is being formed at Kenosha, Wis., and will be incorporated with a capital of $300,000. The company is being promoted by Martin B. Winther, formerly connected with the Thomas E. Jeffery Company and later associated with the Nash Motors Company.

Cleveland

CLEVELAND, OHIO, Nov. 27, 1916.

Inquiry is good, particularly from machine-tool builders and makers of metal stampings, many of whom contemplate the installation of additional equipment next year and desire information as to deliveries and cost of machinery in order that the boards of directors may make the necessary appropriations in case it is decided to go ahead with proposed extensions. With delayed deliveries, some buyers are hesitating about closing at present prices for extended future delivery, thinking lower prices are possible by the time the machines are wanted. Dealers report a more quiet market the past week in the volume of definite inquiries. Considerable extension work continues to come out, involving additional machinery requirements. The demand for boring machines is active. One manufacturer who had several boring mills in various sizes for delivery the first half of next year had these taken up quickly this past week by Akron tire manufacturers.

The Bettcher Mfg. Company, Cleveland, maker of washers, automobile and other metal stampings, will enlarge its plant by the erection of an addition, 50 x 170 ft. All but a small section of this will be two stories. The additional space is needed to relieve the congested condition of the machine shops and provide increased capacity. New presses and other equipment will be installed, orders for which have about all been placed.

The Lamson-Session Company, Cleveland, manufacturer of bolts and nuts, will enlarge its plant by the erection of a three-story addition, 50 x 80 ft., to its bolt and nut works and a steel storage building, 40 x 200 ft. Some new crane and other equipment will be required, orders for which have been placed. The company has increased its capital stock from $300,000 to $1,000,000 to take care of extensions in its plant and business.

The Cleveland National Machine Company, Cleveland, recently incorporated, has purchased the plant of the National Adding Machine Company, 1384 West Seventieth Street, and will engage in a jobbing business in tools, dies and special machinery. Later arrangements will probably be made to manufacture a line of products. The officers are H. D. Marble, president; Harry Newell, vice-president; George D. Harres, secretary, and C. B. Green, treasurer and manager.

The K. D. Carburetor Company, Cleveland, manufacturer of carburetors, will erect a new three-story concrete factory, 100 x 250 ft., at East Thirty-second Street and St. Clair Avenue.

The McLaren Iron Works, Cleveland, will erect a one-story brick and steel structure, 62 x 120 ft., at 1725 Urbana Road.

The Ellwell-Parker Electric Company, Cleveland, maker of storage battery industrial trucks and tractors, will enlarge its plant by the erection of a four-story building, 60 x 120 ft. This will be a duplicate of an extension built some time ago. A third unit of the same size is contemplated early next year.

The Cleveland Twist Drill Company, Cleveland, will enlarge its plant by adding a story, 40 x 150 ft., to one of its four-story buildings.

The Goedecke Specialty Company, Cleveland, is the name of a new firm that will establish a plant at Fifty-first Street and Superior Avenue, to manufacture metal specialties.

The American Auto Trimming Company, Cleveland, has leased quarters in a factory building of the Properties Company on East Seventy-second Street, Cleveland, in which it will establish a plant.

The H. J. Walker Company, Cleveland, which is engaged in machine work for the Chandler Motor Car Company, has under way a plant extension and contemplates the erection next spring of a four-story addition, about 125 x 300 ft.

The Lowe Mfg. Company, Cleveland, will shortly place contracts for a factory addition, 30 x 70 ft.

The Farad Electric Company, Cleveland, has been incorporated with a capital stock of $500,000 to manufacture electric devices. J. L. Huston and others are promoting it.

The Lochs Machine & Mfg. Company, Cleveland, has been incorporated with a capital stock of $10,000 by A. A. Lodge and others.

The Youmans Machine Company, Cleveland, has been incorporated with a capital stock of $50,000 by G. A. Welch, J. C. Barley, G. B. Siddall and others.

It is announced that the Toledo Railways & Light Company, Toledo, which is controlled by the Doherty interests, plans to erect a new power plant of about 120,000 kw. capacity. It is expected that definite plans will be decided upon shortly.

The Knight Tire & Rubber Company, Canton, Ohio, has been purchased by the Fabricord Company, which is capitalized for $20,000,000. N. W. McLeod, St. Louis, Mo., is president. It is stated that an addition to the plant will be built.

The Norwalk Drilling Tool Company, Norwalk, Ohio, will enlarge its plant by the erection of an extension, 48 x 60 ft. Some new equipment, including an 8000-lb. hammer and a 200-hp. boiler will be installed.

Robert Kirk, Findlay, Ohio, has purchased a building which he will equip for assembling light motor trucks and touring cars.

The Mansfield Lock Washer Company, Mansfield, Ohio, a new company, plans to erect a plant, 50 x 150 ft., to manufacture lock washers used largely by the automobile trade.

The Hester Tire & Rubber Company, Cleveland, has entered into a contract with the Commercial Club of Delphos, Ohio, to establish a plant in that city to manufacture automobile tires and other rubber products. The erection of a two-story factory building, 50 x 150 ft., is contemplated.

Catalogs Wanted

The Stambaugh-Thompson Company, Youngstown, Ohio, jobber of hardware, etc., will be pleased to receive catalogs and other information concerning equipment used by road and building contractors.

Indianapolis

INDIANAPOLIS, IND., Nov. 27, 1916.

The plant of the Dockwiler & Kingsbury Fertilizer Company, Indianapolis, was destroyed by fire Nov. 23 with a loss of about $35,000.

The Engle-Phillips Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture grippers. The directors are Samuel B. Phillips, Albert M. Engle and C. I. Phillips.

The Hassler Motor Company, Indianapolis, has been incorporated with $200,000 capital stock to manufacture automobiles, motor trucks, etc. Robert H. Hassler, Edward D. Fouts and David G. Ong are the directors.

The Irvine-Fessler Motor Corporation, Indianapolis, has been incorporated with $25,000 capital stock to manufacture automobiles. The directors are Dennis J. Bush, Robert V. Fessler and John Irvine.

The South Bend Current Control Company, South Bend, Ind., has been incorporated with $15,000 capital stock to manufacture electrical appliances. Dana E. Westcott, Charles H. Zwergel and Harvey Koontz are the directors.

The Standard Wheel Company, Terre Haute, will build a plant for the manufacture of malleable steel castings, mainly hubs for automobile wheels.

The Elkhart Stamping & Tool Company, Elkhart, Ind., has been incorporated with $25,000 capital stock to manufacture tools. The directors are Alexander H. Hyndman, Oliver A. and Bert D. Gause.

The Gary Motor Truck Company, Gary, Ind., has increased its capital stock from $25,000 to $50,000.

The Frankfort Motor Car Company, Frankfort, Ind., has been incorporated with $250,000 capital stock to manufacture automobiles and accessories. The directors are George L. Thompson, Frank E. Coulter and Robert E. Stevenson.

The National Spring Company, Newcastle, Ind., has increased its capital stock from $25,000 to $50,000.

The Columbus Art Metal Company, Columbus, Ind., has been incorporated with $100,000 capital stock to manufacture metal furniture, office and hospital supplies, etc. The directors are W. H. Alford, J. T. A. McClurg and M. J. Schultes, Indianapolis, and Herman L. Rost, Joseph V. Hilger and H. Karl Volland, Columbus.

The American Appliance Company, Indianapolis, has been incorporated with $40,000 capital stock to manufacture electrical appliances. The directors are Arthur Taylor, R. T. McFall and H. D. Haring.

The Farmers Utility Company, Evansville, Ind., has been incorporated with $50,000 capital stock to manufacture machinery. The directors are Harvey C. Weber, William J. Schuler and Hayward Flickner.

The plant of the Whiteley Malleable Castings Company, Muncie, Ind., was destroyed by fire Nov. 20 with a loss of $150,000. It was one of the largest of its kind in the Middle West, employing about 800 men.

The Page & Jones Chemical Company, Hammond, Ind., has let contract for a one-story addition, 60 x 250 ft., to be used as a warehouse and machine shop.

The W. D. Patton Gas Company has broken ground for a factory at West Hammond, Ind., to cost $25,000. Of the investment about $15,000 will be expended for equipment.

The Clo-Mix Company, Elkhart, Ind., has been incorporated with a capital of $25,000, to manufacture warm air registers. The incorporators are Andrew H. Beardsley, Chester A. Mixer and Harry E. Clove.

The Metal Auto Parts Company, Connersville, Ind., has increased its capital stock from $50,000 to $150,000.

Swayne-Robinson & Co., Richmond, Ind., have announced plans for the construction of another foundry, which will be practically a duplicate of the one built last spring and will cost approximately $4,000.

The plant of the Jackson Shovel & Tool Company, Montpelier, Ind., was sold to Capt. Henry Channon of Chicago for $23,000.

Don H. Harris, 3230 Webster Street, Fort Wayne, Ind., will build a garage, 44 x 150 ft., and will purchase some light machine-shop equipment.

Fire completely destroyed the main building of the Auburn Foundry Company, Auburn, Ind., causing damage estimated at about $3,000.

About $400,000 is to be spent for the enlargement of the shops and yards of the Pennsylvania railroad at Logansport, Ind.

Cincinnati

CINCINNATI, OHIO, Nov. 27, 1916.

The cost of building a machine tool of any kind is stated by local manufacturers to be higher than at any time in the past. Recent sharp advances in pig iron have run up the cost of castings, while semi-finished parts, such as gear blanks, etc., are quoted at a high-water mark. It is needless to call attention to the price of high-speed steel and to the advanced cost of labor. Leading machine-tool makers believe that, with these conditions, there can be no chance for an early reduction in the prices of machine tools, although the foreign demand is not nearly so brisk as it was the latter part of last year. On the other hand, if any readjustments are made they will tend toward a higher level.

The domestic inquiry has improved considerably in the past few days, but actual orders are slow in closing. With the exception of some recent business booked for shipment to France, nothing of note has transpired, although both Spain and Italy are good customers and have some unclosed inquiries out. A few lathes were recently sold for shipment to Russia via the Pacific Ocean route.

The domestic and foreign call for portable electric drilling machines is said to be holding up remarkably well. Small electric motors are also in good demand.

The Sayres & Scoville Company, Cincinnati, carriage builder, has increased its capital stock from $150,000 to $650,000, and is having plans prepared for a large factory to be erected at Winton Place to be devoted to the manufacture of automobiles and special auto-trucks. Complete building plans are not yet available. The company's former plant on Colerain Avenue was recently destroyed by fire.

The Cincinnati Sheet Metal & Roofing Company, Cincinnati has acquired an additional site adjoining its plant, on which will be erected a three-story storage building.

The Cincinnati Milling Machine Company, Oakley, Cincinnati, has had plans prepared for a three-story reinforced concrete addition to its plant, 20 x 75 ft., for storage purposes.

The Western Water Motor Company has removed its plant from Oxford, Ohio, to a manufacturing building at 2105 Central Avenue, Cincinnati. The company makes washing machines and has sufficient equipment for its present needs.

On Nov. 22 fire almost completely destroyed two large manufacturing buildings, part of the plant of the Manufacturers' Production Company, Dayton, Ohio, entailing an estimated loss of $150,000. The company is engaged in the manufacture of war munitions. Rebuilding plans have not yet been announced.

It is currently reported, but not officially confirmed, that the Big Four Railroad Company will enlarge its repair shops at Columbus, Ohio, and also construct a new roundhouse at that point.

The Mansfield Lock Washer Company, Mansfield, Ohio, has been incorporated with $50,000 capital stock to manufacture lock washers, by A. E. Witter and others.

It is rumored that the Dayton Malleable Iron Company, Ironton, Ohio, is having plans prepared for a large addition to its foundry.

The Municipal Machine Mfg. Company, Piqua, Ohio, has been incorporated with $25,000 capital stock to manufacture street sweepers. J. A. Schroeder is one of the principal incorporators. Nothing is known as to equipment needs.

The Harbison-Walker Refractories Company has tentative plans under way for increasing the capacity of its plant at Portsmouth, Ohio.

The daily press reports that the Ladel Mfg. Company, New Philadelphia, Ohio, has been incorporated with $50,000 capital stock, to operate a gray-iron foundry. U. B. Miller is one of the incorporators.

The Pioneer Window Glass Company, Marietta, Ohio, has been incorporated with $80,000 capital stock by B. F. Strecker and others, for the purpose of establishing a glass factory.

A deal has been closed merging the Love Foundry Company of Winchester, Ky., and the Cincinnati Machine Tool Company.

Detroit

DETROIT, MICH., Nov. 27, 1916.

The machinery and supply business continues to be excellent and dealers anticipate no let up. Deliveries are still far off, and it is wise for customers to anticipate their requirements as much as possible in order to secure their needs on time. Automobile factories in Detroit are expecting to enlarge and renovate their plants before the rush of spring business. The car congestion in this district is holding up deliveries and also cutting down orders by seriously delaying building operations.

It is reported that the Michigan Central Railroad is about to take bids on car shops at Detroit and Jackson, Mich.

The General Motors Company, through W. C. Durant, president, has begun the construction of a building on Holbrook Avenue and the Grand Trunk Railroad to be used for the manufacture of motors for its allied companies. The building will be 200 x 734 ft., one story. The contract has been let to the W. E. Wood Construction Company and is to be finished in 60 days.

The Paige-Detroit Motor Car Company has voted to increase its capital stock from $2,000,000 to $3,500,000 to provide larger working capital and to enable the company to carry larger stocks of material.

The Ball & Ball Carbureter Company, Detroit, has been incorporated with $20,000 capital stock by Frank H. Frederick O. and Kate D. Ball.

The Western Tool Works, Holland, Mich., has let contract for an addition to its factory.

The Grand Trunk Railway has undertaken the construction at Port Huron, Mich., of a plant for the repair of freight and passenger cars.

The Unaversol Superheater Company, Detroit, has been incorporated by Charles R. Talbor, W. F. Flieder and B. A. Geoghan.

The Michigan Quartz Silica Company, Ishpeming, Mich., is constructing a silica mill to take the place of the one destroyed by fire about the first of the year. With its new equipment, the mill will have a capacity of about 40 tons in 10 hr.

The Standard Machinery Company, Owosso, Mich., has increased its capital stock from $20,000 to $32,000.

The new Cadillac Motor Company factory at Clark and Michigan avenues, Detroit, will be erected next year at a cost of $1,250,000, according to an announcement made last week at the annual meeting of the General Motors Company, of which the Cadillac Motor Company is a subsidiary. The Cadillac Company is at present starting work on yet another seven-story building, at Woodward and Burroughs avenues, to be used as a sales and service department. It is expected that the building will be ready for occupancy by July 1. Considerable machinery and tools will be needed for the repair and overhaul work which will be done on the top five floors.

The Duplex Truck Company has been organized at Lansing, Mich., with a capital stock of $1,000,000 to take over the business of the Duplex Power Car Company of Charlotte, Mich. The plant of the old company will be moved from Charlotte to Lansing, where a factory large enough to greatly increase the output will be built. H. M. Lee, now assistant sales manager of the Reo Motor Car Company, Lansing, has been elected president and general manager of the new company, H. E. Bradner, vice-president,

and George W. Hewitt, now credit manager of the Reo Company, secretary and treasurer.

The Auto Specialties Mfg. Company, with a plant at St. Joseph, Mich., has closed a contract with the Overland Automobile Company to equip all its machines with the Bair auto top holder, the chief product of the company. The order involves the manufacture of 300,000 sets each year. A total of 3,000,000 holders will probably be manufactured at the new St. Joseph plant in 1917.

The Durand Hoop Company, Durand, Mich., is installing modern machinery to take care of the increased demand in its plant.

The output of the Pontiac Chassis Company, Pontiac, Mich., which has been taken over by the new Olympian Motors Company, will double and then triple its output within a short time. R. A. Palmer is president and general manager of the Olympian Motors Company.

The recent announcement that the International Metal Stamping Company, 332 Artillery Avenue, Detroit, Mich., will build a new factory is incorrect. It has purchased the plant of the Diamond Mfg. Company instead.

Announcement has been made that the Michigan Malleable Foundry Company has been absorbed by the Auto Specialties Company of Joliet, Ill. The foundry company now has two buildings under construction at St. Joseph, Mich., and two more will be added, giving the united plants 75,000 feet of floor space.

Catalogs Wanted

The Monta Mower Company, Traverse City, Mich., desires to receive catalogs on the following apparatus: Power presses, 16 and 18-in. lathes, 20-in. power feed drill presses, bench drills, electric welders, grinding machines, bending machines, woodworking machinery, small power screw drivers, heat-treating furnaces for steel, electric and crucible steel, small tapping machines and machine paint. G. T. Montague should be addressed.

The Central South

LOUISVILLE, KY., Nov. 27, 1916.

No important changes in the trade situation have developed the past week. The volume of business continues satisfactory and inquiries in most lines are holding up. Waterworks, lighting plants and coal development projects are most numerous, although many inquiries are appearing for supplies and equipment for oil well operations. Manufacturers of metal products are contemplating further advances on their products.

The Standard Oil Company of Kentucky, Louisville, Ky., has acquired additional ground adjoining its plant and is reported to be planning a refinery to cost $1,000,000. C. T. Collings is president.

The Central Motor Car Company, Louisville, Ky., has been incorporated with $15,000 of capital stock, by Allen H. Douglas, Robert Thomas and Horace C. Dunavent.

The Quaker City Oil & Gas Company, Winchester, Ky., has been incorporated with capital stock of $25,000 by F. C. Wilson, N. C. Day and J. L. Oldham.

The Kentucky Utilities Company, Lexington and Louisville, Ky., has purchased the Glasgow Electric Light & Ice Company, Glasgow, Ky., at a reported price of $100,000 and will establish a central station there, to supply surrounding communities.

The Sanitary Fountain & Cooler Company Owensboro, Ky., has been incorporated with capital stock of $50,000, by C. T. and J. H. Daniel, D. M. Griffith and Charles Bauman. It will manufacture a patented water cooler and fountain.

The Murphy Chair Company, Detroit, Mich., has purchased the old plant of the Stenotype Company, Owensboro, Ky., at a reported price of $50,000, and proposes to remodel and extend it for occupation.

The tipple, engine room and boiler house of the Advance Coal Company, Hillside, Ky., were destroyed by fire with a loss of $30,000. W. S. Thomson, Madisonville, Ky., is superintendent.

Fire destroyed the plant of the Whitley Malleable Iron & Casting Works, Muncie, Ind., with a loss estimated at $250,000.

The Dixie Motor Sales Company, Memphis, Tenn., has been incorporated with capital stock of $25,000 by Julian L. Brode, F. W. Brode, Max Patteson, R. B. Hebdon and C. N. Bender to manufacture and sell automobiles.

H. J. Moore, Sweetwater, Tenn., is in the market for an oil engine of 75 to 100 hp. and a gasoline engine of the same capacity.

The Jonesboro Supply House, Jonesboro, Tenn., is in the market for a 35-hp. boiler for heating and a 10-hp. alternating current, three-phase motor.

The John G. Duncan Company, Knoxville, Tenn., is asking for dealers' price for immediate delivery on a 300 to 400-hp. water-tube boiler, Sterling preferred.

St. Louis

ST. LOUIS, MO., Nov. 27, 1916.

The machine-tool market continues at a very good level, with no interference by second-hand equipment. The aggregate of transactions is at present only limited by deliveries which are now for the most part twelve months away. Negotiations are constantly pending and new transactions put under way; but no disposition is found to put lists out, because the prevailing conditions do not permit much competition. Extensions of plants as well as the establishment of new enterprises assure a very satisfactory business for some time to come. Bank reports show greater ease of investment and loan funds than ever before, while collections are far above normal in all lines.

The Saunders Motor Power Company, Public Library Building, East St. Louis, Ill., is preparing to equip a plant for the manufacture of a rotary motor operated with steam, gas or gasoline. Joseph H. Keys is president. Roy Saunders, Robert Logan and Henry Bode are active in the enterprise.

The Wagner Electric Mfg. Company, now building a plant addition, has plans in reserve for still further construction, which will practically double its present capacity.

The Measuregraph Company, St. Louis, Mo., has leased a new factory at 1819 Olive Street, St. Louis, and will install machinery increasing its output of measuring machines by six times its present amount.

The Thatcher-Kerwin Glass Company, St. Louis, Mo., has leased new quarters and will install equipment for the manufacture of plate glass, etc.

The Kansas City Lock Company, Kansas City, Mo., has been incorporated with a capital stock of $50,000 by Frank Dougherty, John Haward and David F. Hornbuckle.

The Kansas City Light & Power Company, Kansas City, Mo., John H. Lucas, president, will expend from $3,000,000 to $5,000,000 on its proposed plant and equipment. Preliminary work is now being done.

The Brokers' Office & Warehouse Company, Kansas City, Mo., will install about $75,000 of cold storage equipment.

The Bayer Steam Soot Blower Company, St. Louis, Mo., has increased its capital stock by $10,000 for the purpose of increasing its output.

The Lincoln Steel & Forge Company, St. Louis, Mo., has increased its capital by $25,000 for the purpose of adding to its equipment, etc.

The Dumore Heating & Ventilating Company, St. Louis, Mo., has been incorporated with a capital stock of $15,000 by John W. Marx, George A. and Henry V. Deemar to manufacture heating and ventilating apparatus.

The Collapsible Joist Form Company, Kansas City, Mo., has been incorporated with a capital stock of $16,000 by E. C. Marqua, Hans Van Enwarth and J. R. Byrd to manufacture patented forms for concrete work.

The St. Joseph Structural Steel Company, St. Joseph, Mo., is preparing to double its equipment and capacity.

F. E. Scott, Kansas City, Mo., will equip a garage and machine shop to cost $19,000.

The St. Louis, Iron Mountain & Southern Railway Company, E. A. Hadley, St. Louis, chief engineer, will equip a roundhouse and machine shop at Gurdon, Ark.

The St. Francis River Gin Company, Parkin, Ark., has been incorporated with a capital stock of $10,000 by I. R. Dye, W. L. Banks and R. W. Minnie, and will purchase cotton compress and gin equipment.

The Bain Mfg. Company, Pine Bluff, Ark., has been incorporated with a capital stock of $30,000 by D. B. Niven, A. J. Robinson, J. C. Bain, and others, to equip a cottonseed oil mill.

Lindsay, Okla., will purchase an engine and other equipment, to cost about $6,000, for its waterworks and electric light plant.

Tulsa, Okla., will equip a low service pumping unit at the city waterworks pumping station. Stevens & Stiles, Kansas City, Mo., are the engineers.

The Cloco Gasoline Company, 407 Unity Building, Tulsa, Okla., will install compressing plant machinery with a capacity of 1,000,000 cu. ft. of gas daily.

M. Mortenson, Fairfax, Okla., will equip a garage and machine shop, 75 x 140 ft., and is in the market for machinery.

The Churchill Milton Lumber Company, Greenwood,

Miss., John Churchill, Louisville, Ky., president, will equip a hardwood lumber mill of 100,000 ft. per day capacity, to cost about $35,000.

The Stern Foundry & Machinery Company, New Orleans, La., will build additions to its plant, including a foundry and machine shop, which will cost approximately $100,000.

Birmingham

BIRMINGHAM, ALA., Nov. 27, 1916.

Machinery dealers are unable to supply the demand for machine tools. Second-hand dealers have scoured the territory and report everything taken. The coal shortage has stimulated the demand for electrical apparatus. Gasoline engines cannot be supplied fast enough. The trade reports good conditions all round.

The Norway Graphite Mining Company, Birmingham, has been incorporated with a capital stock of $100,000 by R. H. Cobb, Roy M. Sterne, E. L. Muchmore, and others, and will operate a mill in the Ashland district.

George W. Parks, Stuart, Fla., and others, are considering the building of a hydroelectric plant.

The J. H. Hodges Lumber Company, Apalachicola, Fla., will establish a hardwood mill with a capacity of 20,000 ft. per day.

The Vida Lumber Company, Clanton, Ala., will build a narrow-gage railroad, establish a sawmill and develop a turpentine industry on 15,000 acres nearby.

Texas

AUSTIN, TEX., Nov. 25, 1916.

The Post City Brick & Tile Company will build a plant at Post City for manufacturing brick and tile, to cost about $10,000.

An issue of $100,000 bonds is now available for enlarging the municipal waterworks plant at Austin. Another bond issue of $230,000 is to be used for the construction of municipal docks and terminals, and the installation of electric loading and unloading devices upon the deep-water front.

Wilbur Bush & Son, Poteau, Okla., will build an ice and cold storage plant at El Paso, to cost about $60,000.

H. P. Miller, Fort Worth, plans to build a plant at Dallas for manufacturing an automobile appliance.

The Pacific Northwest

SEATTLE, WASH., Nov. 21, 1916.

That December is expected to be a big month in Puget Sound shipping circles is indicated by the fact that Frank Waterhouse & Co., Inc., will handle 45,000 tons of cargo in transpacific trade in that period. October showed the third greatest monthly record in the history of Seattle, with shipments of $38,347,629, making the total for the first 10 months of 1916 $340,560,926, as compared with $257,792,393 for the entire year of 1915.

West coast lumber mills have orders totaling 359,139,860 ft., delivery of which is causing grave concern. Of this amount approximately 10,428 carloads are for transcontinental haul, which the increasing car shortage threatens to seriously interfere with. Mills have partially adjusted themselves to scarcity in ocean tonnage, which has been somewhat relieved in the past two months by curtailing production. The Southern Pacific Company reports cars are now on the way to Oregon to relieve the great shortage there.

The Peninsula Shipbuilding Company, St. Johns, Ore., plans to build two more sets of ways, making four in all. The two five-masted auxiliary schooners now under construction will be followed by three others of the same type.

The J. F. Duthie Shipbuilding Company, Seattle, recently signed a contract with Norwegian interests for another 8800-ton steel steamship, making the seventh vessel now under contract.

The New-York-Montana Testing & Engineering Company, Helena, Mont., plans the installation of a testing plant. It was recently incorporated with a capital stock of $100,000, with Charles E. Fryberger, president, and Hugh Smith, vice-president. The initial plant will cost $35,000 and will have a capacity of about 50 tons daily.

The Washington Iron Works, Seattle, plans to immediately erect a foundry addition to its factory, 48 x 72 ft., one-story.

The Seattle Paint Company, Seattle, will shortly receive bids for its proposed two-story factory, 50 x 100 ft., to be built at its plant at a cost of about $20,000. It will be equipped with new machinery.

The Columbia Engineering Works, Linnton, Ore., reports that it has sufficient business now booked to insure continuous operation for two years. It is stated the plant will be enlarged.

The sawmill of the Hillgard Lumber Company, Whitney, Ore., was completely destroyed by fire recently, with a loss of $25,000. It is understood the plant will be rebuilt at once.

William Bryand, Florence, Ore., is at the head of a project to erect a shipbuilding plant in Florence, to cost $100,000.

It is announced that the Norwegian-American Line, a new transpacific shipping company, recently organized, will establish headquarters in Seattle. It purchased one freight vessel, and four others are now under construction in Japanese yards, at a cost of $4,000,000. The company will operate between the Pacific coast and Oriental points. This makes the sixth transpacific line operating out of Seattle, with a total monthly commerce to and from the Far East of $18,000,000.

Plans for the proposed shipbuilding plant to be erected in Portland for the Columbia Shipbuilding Company have been completed. The main building will be 65 x 600 ft., costing $16,000. Three shipways are to be built, each 510 ft. long, and costing $22,000. The company was recently organized by members of the Northwest Steel Company and the Smith & Watson Iron Works. R. F. Arndt, of the Northwest Steel Company, Portland, has charge of construction.

The I. L. Hirsch Radiator Works, Tacoma, Wash., plans the construction of a three-story building, 80 x 100 ft., to cost $25,000.

The new power plant of the Hawley Pulp & Paper Company's plant in Oregon City, Ore., was recently damaged by fire with a loss of $6,000. Principal loss was to the generating machinery. The power plant is part of the new $1,000,000 addition under way.

The Olympia Shingle Company, Olympia, Wash., recently organized to take over the holdings of the defunct Democratic Emergency Shingle Company, Olympia, is completing plans to install new equipment in the plant. It will have an output of 250,000 shingles daily.

It is stated that the plant of the Yellowstone Packing Company, Billings, Mont., now under construction, will be ready for operation about Jan. 15. It will represent an expenditure of $150,000.

Plans for the proposed shipbuilding plant of the Ames Shipbuilding & Dry Dock Company, to be erected in Seattle, are nearing completion in the offices of Lee & Brinton, naval architects, Seattle. The plant will cost $80,000, and will include a plate shed 160 x 440 ft., machine shop 95 x 240 ft., wood-working shop, furnace, blacksmith shop, an office buildings, power plant and three shipways. The company has secured contracts and completed plans for three steel vessels, costing $2,500,000.

It is announced that the Gorham Engineer Works, on the tidal canal, Oakland, Cal., has been taken over by the Skandia-Pacific Oil Engine Company, for a consideration said to be $100,000. It is stated the plant will be enlarged to double its present capacity.

Improvements by the Southern Pacific Railway Company at Eugene, Ore., have been approved, and construction will start in the near future. The plans include a roundhouse, pump house with machine shops, etc., at a total cost of about $150,000.

The Chase Patented Beds Company, Seattle, will erect a two-story factory, 105 x 120 ft., to cost about $45,000. Work will begin about Dec. 15.

The Western Gear Works, Seattle, plans the construction of a two-story plant on Ninth and King streets, which will cost about $10,000.

The Snow Mfg. Company, 945 North Main Street, Los Angeles, Cal., manufacturer of irrigation appliances, tools for making concrete pipe, etc., has purchased a site, 145 x 240 ft., and has started the construction of a foundry and manufacturing plant to be completed in 60 days. Frank P. Snow and Frank S. Livingstone are the proprietors.

Canada

TORONTO, Nov. 27, 1916.

The Dodge Metal Hose Company of Canada, Ltd., is arranging for the erection of a plant at Galt, Ont., to cost $50,000. Machinery to cost $22,000 will be installed. The company will manufacture malleable iron hose, to replace rubber hose used to couple the air line between railway cars. It has also Canadian patents for the manufacture of five other articles, to be turned out in the plant, which is to be erected at Galt. J. R. Cameron, 381 Lansdowne Avenue, Toronto, is active in the company.

The Dominion Creosoting Company, Ltd., South Vancouver, B. C., is erecting a large addition for the manu-

facture of knockdown granaries, for which a large demand exists in the Canadian West.

The Consolidated Mining & Smelting Company, Trail, B. C., is erecting an addition to its electrolytic zinc plant, 165 x 200 ft.

The Port Hope Sanitary Mfg. Company will establish a factory at Port Hope, Ont. Fred Armstrong, Toronto, is general manager.

The Canadian Buffalo Forge Company, Kitchener, Ont., has started work on an addition, 100 x 150 ft., that will double the capacity of its plant. The new addition will cost $100,000.

Construction work has been started on a galvanizing plant for the McClary Mfg. Company at London, Ont., to cost $20,000.

Work has been started on the erection of a factory building at New Toronto, Ont., for the Dupont Fabrikoid Company, Dufferin Street, Toronto, manufacturer of leather goods. The building will cost $75,000 and machinery to cost $175,000 will be installed.

The Public School Board, Edmonton, Alberta, will increase the capacity of the school machine shop. F. Brody is secretary.

Tenders will shortly be called for the erection of the first unit of the grain elevator to be built on the river front at Fort William, Ont., for Sellars Brothers' Elevators, Ltd., Grain Exchange, Fort William, to cost $75,000. Harry Sellars, care the Canadian Northern Elevator Company, Port Arthur, is engineer.

The Tallman Brass Company, Hamilton, Ont., has had plans prepared for the erection of an addition to its plant to cost $4,000. It also proposes to build a brick addition to cost $50,000. Stewart & Whitton, 7 Hughson Street South, Hamilton, are the architects.

Flavelles, Ltd., Lindsay, Ont., proposes to rebuild their cold storage plant which was recently destroyed by fire. The plant will be of brick construction and will cost $75,000. H. S. Johnson is secretary.

The Canadian Robert Dollar Company proposes to build a sawmill and docks at North Vancouver, B. C., at an approximate cost of $200,000. The sawmill will be operated by electricity and about 800 ft. of dock will be constructed.

J. S. Emerson, 744 Hastings Street West, Vancouver, B. C., proposes to build a sawmill, dry kilns, shingle and planing mills at Prince Rupert, B. C.

The Dominion Machinery Company, 110 Church Street, Toronto, has had plans prepared and will erect a brick factory at 14 Darling Avenue, Toronto, to cost $5,500.

The International Machineries, Ltd., Montreal, has awarded the contract to Anglins, Ltd., 65 Victoria Street, for the erection of a plant on Notre Dame Street.

The Canadian Cooperage Company's plant on Union Street, Smith's Falls, Ont., was destroyed by fire with a loss of $10,000. The company proposes to rebuild and will require new machinery.

The Day & Woolworth Handle Company, Louisville, Ky., will erect a plant at Hamilton, Ont. It has secured property opposite the Canada Steel Goods Company and will commence the erection of its plant soon.

The Trudeau Carriage, Ltd., Montreal, has been incorporated with a capital stock of $49,000 by Theophile Trudeau, Maximilien Renaud, Jean L. Poirier, and others.

The Musical Instruments, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Ambrose T. Pike, 682 Bathurst Street; Jacob A. Moore, B. S. Stright, and others.

The Beaver Board Timber Company, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by James W. Bicknell, John B. O'Brien, John S. Duggan, 25 Harbord Street, and others, to manufacture pulp.

The Reid Products Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Lerritt A. Reeves, 203 Mail Building, Albert C. F. West, and others, to manufacture incinerators, metallic specialties, etc.

The Borbridge Saddlery Company's factory at Winnipeg, Man., was totally destroyed by fire with a loss of $100,000. S. B. Borbridge is manager.

The Beacon Match Company proposes to erect a plant at Bracebridge, Ont., to cost $45,000, to have a capacity of 100 cases of matches per day.

It is reported that John Coughlan & Sons, steel manufacturers, Beatty Street, Vancouver, B. C., propose to establish a shipbuilding yard on False Creek. Plans have been drawn and it is expected that construction work will be commenced as soon as sufficient labor can be secured.

Government Purchases

WASHINGTON, D. C., Nov. 27, 1916.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until date not set, schedule 398, for two muffle type electric furnaces for Newport; schedule 404, for 8 motor-driven main air pumps for condensers, and schedule 405, for 4 main feed water heaters, all for Brooklyn and Mare Island; schedule 407, for 2 generating sets for Philadelphia; schedule 408, for 8 water-tube marine boilers for Brooklyn; schedule 409, for miscellaneous fire and bilge pumps for Boston; schedule 413, for two 24-in. x 10-ft. geared lathes, three 14-in. x 6-ft. geared head lathes and one power gap shears, all for Washington; schedule 414, two 12-in. x 8-ft. geared head lathes, one 14-in. x 12-ft. head lathe, two 14-in. x 9-ft. geared head lathe and two milling machines, all for Washington; schedule 426, for two hand screw machines; schedule 427, for one pneumatic riveting machine for Philadelphia; schedule 428, for 38 trolley hoists; schedule 430, for 35 testing generators, and schedule 439, for 24 portable electric drills, all for Brooklyn; schedule 452, for nine 6-in. handy billy pumps for Mare Island.

Proposals will be received by the Bureau of Yards and Docks, Navy Department, Washington, until 11 a. m., Dec. 4, for furnishing two fitting-out cranes for Mare Island.

The general purchasing officer of the Panama Canal, Washington, will receive sealed proposals until 10.30 a. m., Dec. 15, for furnishing centrifugal pumps and equipment.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the naval service as follows:

Schedule 294, Steam Engineering

Class 31, Puget Sound—Six alternating current motors—Bid 21, $1,849.39; 50, $1,917.

Schedule 288, Ordnance

Class 71, Keyport, Wash.—One universal cutter and tool grinding machine—Bid 56, $625.

Class 72, Keyport—One bench-type precision lathe—Bid 18, $1,532.25; 56, $1,582.

Class 73, Keyport—One engine lathe—Bid 56, $1,880; 61, $1,120; 73, $2,231; 81, $1,878.

Class 74, Keyport—One screw machine. Bid 56, $1,350.

Class 75, Keyport—One upright drilling machine—Bid 56, $508; 81, $562.

Class 76, Keyport—One universal milling machine—Bid 10, $3,557 and $3,453; 56, $3,625; 63, informal.

Class 77, Keyport—One engine lathe—Bid 56, $3,545; 74, $4039; 81, $3,842.

Schedule 325, Steam Engineering

Class 121, Brooklyn—Eight turning gear motors, with spare parts—Bid 27, $4,048.84; 50, $4,428.85; 91, $3,489.80.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 10, Brown & Sharpe Mfg. Company; 18, J. Bleser Mfg. Company; 21, Carroll Electric Company; 27, Cutler-Hammer Mfg. Company; 50, General Electric Company; 56, Hallidie Machinery Company; 61, Kemp Machinery Company; 63, Kempsmith Mfg. Company; 73, Manning, Maxwell & Moore, Inc.; 74, Miller Brothers Automobile & Supply House; 81, Niles-Bement-Pond Company; 91, Reliance Electric & Engineering Company.

Brinell Tests and the Law of Similitude

In discussing a paper on the principles of similitude, presented at the recent meeting of the British Association, Prof. C. H. Bulleid gave an instance of the value of one law of comparison in making hardness tests by the Brinell method. The standard size of ball for this test was 10 mm. in diameter. Balls of this size not being available, ⅜-in. balls were used instead and the results reduced to the 10-mm. size. According to the law in question, when the two balls were driven down to corresponding depths, the load necessary would be proportional to the square of the diameter of the balls, and the diameter of the depressions would be proportionate to the ball diameters. It was stated that the law had been tested on a series of balls from ¼ to 3 in. in diameter, and the results were plotted on the co-ordinates of load ÷ the square of the diameter and diameter of impression ÷ diameter of ball. The results were quite consistent so long as the plate used was thick enough to prevent the depression coming through on the opposite side.

Perpetual Inventory and Appraisal Values

(*Continued from page* 1227)

for adoption? Has any appraisal company ever advocated that depreciation be distributed as an operating expense against the product? Can any appraisal company claim with any justice that it can determine proper rates of depreciation without close contact with and full knowledge of the operating conditions and operating needs of an industry? Certainly without such contact and without such knowledge, the claim that successive appraisals are essential factors in the determination of costs, prices and profits, is, to say the least, pure buncombe. The primary business of an appraisal company is to determine an authoritative replacement value, and its entire organization is trained for this purpose. But when the appraisers enter the field of depreciation, operating values, and costs, they are playing wholly out of their class and ought to admit it. They are doing their clients positive harm and are leading them straight to the shoals of financial disaster; for appraisals as previously explained have a distinct upward tendency, and the increases in value which they show as the result of wholly extraneous conditions have the effect of lulling the manufacturer into a wrong sense of financial security.

Standard Depreciation Rates for Factory Buildings and Equipment

Adopted by Manufacturers of Conveyors and Elevators, Chicago, Feb. 25, 1916

A MEETING of manufacturers of conveyors and elevators, called to draw up an agreement on some standardized form of accounting procedure, disclosed that, out of nine manufacturers, two disregarded the question of depreciation, five charged off depreciation to profit and loss and two charged depreciation against operating expenses. The rates of depreciation varied widely and the first step, as told by Mr. Piez in the accompanying paper, was the establishing of the following depreciation standards:

	Per Cent on Cost	Per Cent on Reducing Balance
Buildings and Accessories		
Reinforced concrete or steel and tile	2	3
Brick and steel with non-combustible roof and concrete floors	2.5	4
Brick, steel and wood	3	5
Brick and wood	3	5
Steel frame, wooden roof and corrugated iron walls	3.5	7
Steel frame, non-combustible roof and corrugated iron walls	3	6
Concrete block, with wooden roofs and floors	3.5	8
All wood structures, well built (20 yr.)	4.5	10
All wood structures, cheap (20 yr.)	5	12
Sprinkler system (20 yr.)	4	7.5
Heating and ventilating system (20 yr.)	4	7.5
Water and sewer piping and sanitary fixtures (where separate)	4	7.5
Tanks and reservoirs, steel	4.5	10
Tanks and reservoirs, wood (10 yr.)	9	20
Note: All Repairs and Maintenance to be charged to Account 8059.		
Machinery and Large Equipment		
Boilers, pumps, feedwater heaters and air compressors	6	15
Power piping	6	15
Switchboards, main wiring and conduit	6	15
Engines and dynamos	5	10
Machinery, motors, machine tools, traveling cranes, etc.	4.5	10
Punch presses, bending rolls, power shears and drop hammers	4.5	10
Shafting, pulleys, hangers and belting	50	..
Machine tool accessories—Boring bars, drivers, key seating broaches, etc. (All renewals to repairs)	50	..
Cupolas, converters, melting furnaces and accessories	5	10
Annealing and heating furnaces, ovens, forges, etc.	5	10
Motor trucks	20	60
Storage battery locomotives (battery renewals to repairs)	10	30
Horses and Wagons	12	35
Small Tools		
For machines, net additions	50	..
Hand tools, net additions	50	..
Punches and dies (Standard) net additions	50	..
Chills, iron and steel flasks and accessories, net additions	50	..
Fixtures, Furniture and Miscellaneous Equipment		
Steel shelving, lockers, etc.	5	12
Mechanical appliances, net additions	60	..
Departmental wiring and electric fixtures, net additions	60	..
Miscellaneous items (wood), net additions	70	..
Patterns (Standard)		
Metal, net additions	75	..
Wood, net additions	100	..
All patterns required for a particular order or contract to be charged to the job.		
Drawings		
All new standard drawings to be charged to expense.		
All drawings required for a particular order or contract to be charged to the job.		
Miscellaneous Real Estate Improvements		
Pavements, sidewalks, fences, retaining walls, roadways, tracks, yard drainage, general conduits, tunnels, vaults, etc.	4.5	10

MOST INDUSTRIES CHARGE OFF TOO LITTLE

All of those with whom I have been associated in business for the last quarter of a century have been radicals in their methods of depreciation, but with all of this strong leaning toward what might be considered an excessive write-off, we frequently find when we are ready to discard a tool, or reconstruct a building, that a substantial additional amount must be charged off to profit and loss.

The great majority of industries charge off too little rather than too much, and the appraisal companies are, if anything, assisting—unconsciously of course—in increasing this unprofitable and oft-times disastrous habit.

I had occasion recently to go over the financial statements of a manufacturing plant which had delegated the important function of depreciation to an appraisal company. The amount charged off annually was less than one-half of the proper amount, this being due, the owner said, to the constant and considerable advance in the replacement value of the property. Here was a typical case of reducing the operating burden of a plant by crediting it with a wholly speculative, and unrealizable increase in property value. In this case the appraisal company specified the amount to be depreciated each year and the appraisal company was therefore responsible for this wholly unsound and unscientific procedure. The owner is about to build a new plant, and I take no chances in prophesying that he has some bitter disappointments awaiting him in unforeseen shrinkages of assets when he abandons the old plant.

The problem of determining an adequate scale of

depreciation is by no means a simple one, and it goes hand in hand with the problem of distributing depreciation against the cost of the product. It is astonishing to find how widely the practice among different manufacturers in the same line varies.

As a result, largely of the recommendations made by the Federal Trade Commission that the cost accounting systems of various lines of industry be standardized, the manufacturers of conveyors and elevators have made a determined effort to agree on some standardized form of accounting procedure. The preliminary meeting of the manufacturers and their accountants disclosed the fact that out of nine manufacturers two disregarded the question of depreciation entirely, five charged off depreciation to profit and loss, and only two charged depreciation against operating expenses, making it thereby a component part of the cost. The rates of depreciation varied widely, and the first steps taken by the conference consisted in determining a standard schedule of rates of depreciation. As an item of interest in connection with the subject of this paper, and as an incentive for other lines of industry to determine and agree upon similar standards, I am appending the schedule herewith. The rates are but compromises growing out of the judgment and experience of the individual members of the Conveyor Manufacturers' Conference, but their correctness can be verified by matching the perpetual inventory values which these rates will establish against the actual experience of loss in cash value when equipment or buildings are discarded.

They establish, therefore, a broad basis upon which fair operating values and the shrinkage in these values, due to wear and tear and change in style, can be computed, and serve as the preliminary steps to the equitable distribution of these shrinkages, or depreciation in value over the cost of the product.

I recognize the value of the work done by the appraisal companies in establishing authoritative replacement values for purposes of insurance, for the purpose of comparing the physical values of various plants about to be purchased or merged, or as the foundation upon which a perpetual inventory kept by the industry itself can be based; but I am convinced that only a perpetual inventory providing for a sound schedule of depreciation, and intelligently handled by the management of the industry, is of value in determining the true cost of the product.

Cuban Manganese Ore Deposits

Three groups of manganese ore deposits are recognized in the Santiago district of Cuba, according to U. S. Consul P. M. Griffith, of Santiago. They are the Cristo, Cauto and Ponupo mines, the last, which is the largest, being now a producer of about 3000 tons per month of ore running 43 per cent in manganese. The Cristo mines are turning out a small amount of ore having about 46 per cent manganese, while the Cauto group is producing about 2000 tons per month. The Ponupo and Cristo groups are operated by Aguilera & Co. and the Cauto group by the Cauto Mining Company. The report states that lack of labor has held in check development in this industry and that large undeveloped and undenounced deposits of manganese still exist in the province.

The Compressed Gas Manufacturers' Association will hold its fourth annual meeting at its offices, 126 Broadway, New York City, Jan. 15, 1917, at 2 p. m. As usual the meeting will be followed by the association's annual dinner at the Manhattan Club. Otto S. King, 218 East Forty-second Street, New York City, is secretary and treasurer of the association.

Austrian Manganese Ores and Germany's Supplies

In a paper read at the autumn meeting of the Iron and Steel Institute in London, Sept. 22, 1916, Herbert K. Scott discussed the "Manganese Ores of the Bukowina." These deposits are in the Drona Vatra district of Austria, and while not normally important, they are of considerable value to Austrian steel works when the fortunes of war enables Austria to control that territory. Reference is made to the fact that Germany has a number of manganiferous iron ore deposits, the mineral from which is largely used for the manufacture of spiegeleisen. In 1911 the total production from these deposits amounted to over 3,000,000 tons, containing up to 30 per cent of manganese, but only 300,000 tons had contents of 20 per cent and over, while the greater part gave only 2 to 12 per cent of manganese.

In Austria-Hungary the production of manganese ore never has been on a large scale, and the average output for 1909-1913 was 33,662 tons from Austria, Bosnia and Herzegovina, and Hungary. It was stated by the assistant secretary of the German Iron and Steel Institute in March last that the necessary supply of manganiferous ore for the production of ferromanganese and spiegeleisen during the war had been assured, and that a suitable substitute for manganese had been found for the deoxidation of the steel bath. Since the blockade of the Central powers and the cutting of railroad communication between Russia and Austria prevent the importation of manganese ore suitable for ferromanganese production, it is obvious that the output of manganese ore in Germany and Austria must have increased appreciably.

The author, who visited the Drona Vatra district in 1913, describes the geology and occurrence of the manganese deposits and the methods of working adopted. He said that calculations showed that over 150,000 tons of mineral could be mined from the lenses above No. 1 level, a quantity which would guarantee an annual output of 50,000 tons for three years, while further quantities of both oxide and carbonate ore would doubtless be proved at lower levels.

Cleanliness as a Safety Measure

In a paper on the prevention of infection in connection with safety work, presented at the fifth annual safety congress, Detroit, Oct. 17, Dr. Carlos C. Booth called attention to the fact that gloves worn by workers in steel mills may often be the source of infection in the event of accident. A laundered cloth glove, neatly mended, is much safer than a new glove from the store if an accident occurs to the hand or finger. A case was cited in which a hand was crushed while wearing a glove. The glove was not torn or broken but tetanus set in, resulting in the death of the man. The germ was undoubtedly inside the glove at the time of the accident and it was thought probable that if the glove had been recently boiled, the man would have escaped infection.

The author recommended that in those concerns that could not afford to have a resident physician permanently employed at the plant, all wounds be douched at once with a 3.5 per cent iodine solution and then bound up with a simple dressing, prior to sending the man to the office of a physician. This treatment has reduced the percentage of infection in accidents to an extremely low figure.

In concluding, Dr. Booth gave the following advice: "Teach your men to keep as clean as possible under the circumstances, especially their hands and feet, and to report at once to the emergency hospital without touching the wound and without allowing anyone else to do so or to pour water on it. Allow no one to attend the wound but the attendant at the emergency room or the surgeon, if he happens to be there."

The Bonnot Company, Canton, Ohio, has contracted to furnish one of its latest Holbeck improved powdered coal systems to supply powdered coal to 24 sheet and pair furnaces of the Standard Tin Plate Company, Canonsburg, Pa.

NEW TRADE PUBLICATIONS

Vacuum Drying Apparatus.—Buffalo Foundry & Machine Company, Buffalo, N. Y. Folder representing a bond. calls attention to the advantages secured by the use of the company's vacuum drying apparatus, such as complete control of the process, reduced cost; savings in floor space, steam and fuel; elimination of waste and improved quality of output. The coupons of the bond are given over to engravings of the various pieces of apparatus that can be supplied.

Pneumatic Dust Collecting and Conveying Systems.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Catalog No. 235. Gives general description and specifications for the company's fan systems for collecting dust and conveying materials. The advantages of pneumatic systems of this nature for use in woodworking plants; in connection with grinding, buffing and polishing wheels, tumbling barrels and sand blast machines and in cement plants, coal breakers and shoe factories are briefly pointed out and a number of views of installations are included. Systems for conveying fibrous material, pulverized coal, chips, cork scrap, ashes, etc., are also illustrated. The various fans used are shown and a number of tables of useful information are included.

Steel Stamps.—Weber-Erickson-Bunting Company, Pittsburgh, Pa. Circular. Refers to the use of steel stamps for identifying the workman responsible for any particular piece of work in a shop. Reproductions of the various stamps that can be supplied are presented, together with the identification number and a price list of the different sizes furnished.

Alloy Steels.—Vanadium-Alloys Steel Company, First Avenue and Ross Street, Pittsburgh, Pa. Folder. Devoted to the Vasco-Vanadium line of steels for tools and other work. The various grades are described and considerable information is given on the subjcet of alloy steels in general and their uses. A complete list of carbon steel extras is included.

Tools and Hardware Specialties.—Smith & Hemenway Company, Inc., 99 Chambers Street, New York City. Seventh edition of the "Green Book." Size, 4 x 7 in.; pages, 256. Contains illustrations and brief descriptions of a complete line of tools and hardware specialties, including pliers, tool belts and kits, safety straps, hack saw frames and blades, screw drivers, bits, mitre boxes, nippers, etc. In a number of cases tables of the various sizes of tools that can be supplied are given. An alphabetical list of the lines covered and a numerical one of the list numbers enable any article to be found easily.

Iron and Steel.—Scully Steel & Iron Company, Ashland Avenue and Twenty-fourth Street, Chicago, Ill. November and December stock list and reference book. This publication, which will be issued regularly every two months in the future instead of only a stock list every month, contains in addition to the stock on hand considerable valuable information to the trade. Numerous pages of tables, short cuts, safe loads, etc., taken from the company's Blue Book have been inserted. The book is of pocket size, 4½ x 7 in., and has a thumb index to facilitate finding the various articles carried in stock. In the new book only the sizes carried are listed and no mention is made of quantities.

Engine Lathe.—Climax Machine Company, Lancaster, Pa. Circular. Concerned with a 10-in. engine lathe for light work in machine shops and manufacturing establishments. A brief description is presented and is supplemented by an engraving of the machine and a condensed table of specifications.

Pole Jacks.—Templeton, Kenly & Co., Ltd., 1020 South Central Avenue, Chicago, Ill. Pamphlet. Presents a number of illustrations of a jack in use for pulling and straightening poles, attention being particularly directed to the pulling of a 40-ft. pole imbedded in over 7 ft. of clay in 8 min. A number of testimonial letters and a condensed table of specifications of the jack are included.

Air Compressors and Riveting Hammers.—Ingersoll-Rand Company, 11 Broadway, New York City. Two bulletins. The first, No. 3130, points out the advantages of using a line of power-driven, single-stage straight line air compressors which are built with piston displacement capacities ranging from 52 to 955 cu. ft. per min. A general description of the construction is presented, followed by details of the various parts, the text matter being supplemented by numerous engravings. Dimension tables and diagrams of the compressors, which are equipped with the Ingersoll-Rogler disk type air valve, are included, together with a condensed table of specifications. In the other bulletin, No. 8311, which supersedes No. 8211, illustrations and descriptive matter explain the operation of an inside trigger type of pneumatic riveting hammer. Dimensions and specifications of the six sizes of hammer that can be supplied are presented. Emphasis is laid on the rivet set retainer furnished, which is designed to meet the regulations and requirements of the safety appliance laws enacted in the various states. A number of views of the hammer in use are included.

Gray-Iron Castings.—Houston Car Wheel & Machine Company, Houston, Tex. Catalog. Presents illustrations and brief descriptions of the facilities possessed by the company for turning out gray-iron castings, chilled cast-iron carwheels and doing general machine shop repair work. In the catalog the engravings are presented on one page with the descriptive matter on the facing one.

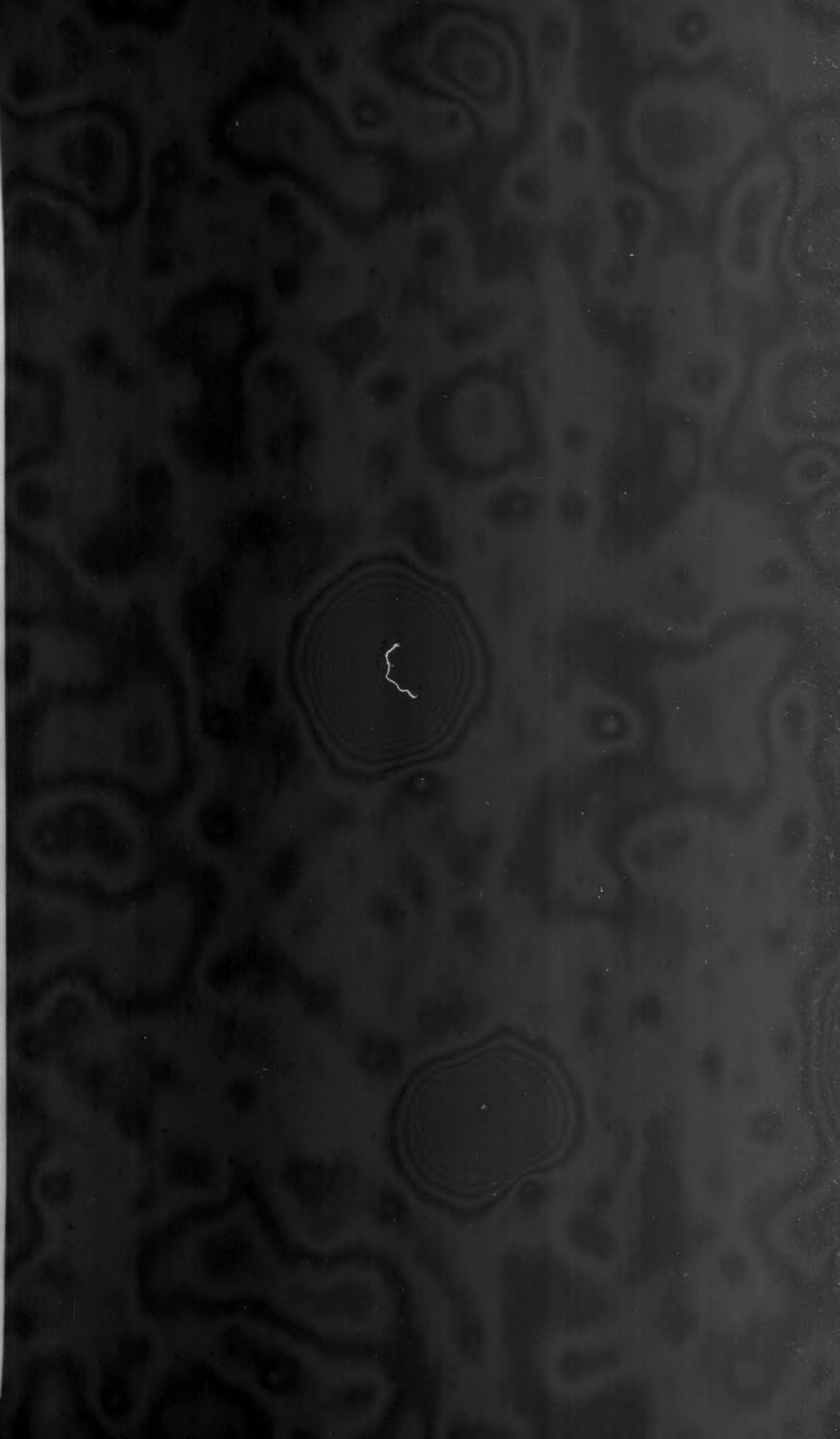
Tool Holders.—Gisholt Machine Company, Madison, Wis. Circular. Gives some of the reasons for using tool holders in turret and engine lathes to utilize pieces of high-speed steel. Views of the different tool holders are presented, together with a table of dimensions of the five sizes that can be supplied.

Motor Trucks.—White Company, Cleveland, Ohio. Pamphlet. Size, 9 x 12 in.; pages, 56. Deals with the use of motor trucks for hauling, dumping, spreading and rolling road material; pulling road machinery, road maintenance and flushing and sprinkling streets. After a brief description of the trucks and their advantages for this work, the records that have been made in constructing and maintaining various forms of road are brought out in extracts from testimonial letters. The pamphlet is profusely illustrated with views of the trucks in use and the work that has been done by them.

Engine Lathes.—J. A. Fay & Egan Company, Cincinnati, Ohio. Bulletins Nos. 200 and 201. Give illustrations and brief descriptions of a 16 and 18 in. standard engine lathe lathe equipped with double sliding back gears. The two bulletins are identical in make-up, an engraving of the machine being given at the top with the description underneath. Each portion of the lathe is given a separate paragraph in the description and the first word in every case relates to the part of the tool covered by that particular paragraph. To attract attention, this is printed in heavy type. A condensed table of specifications follows the description in each case.

Oxy-Acetylene Welding and Cutting.—General Welding & Equipment Company, 107 Massachusetts Avenue, Boston, Mass. Two pamphlets. The first mentions the equipment furnished by the company in its standard welding and cutting outfits. In addition to illustrations of the apparatus views of the torches employed are presented wth the various parts marked. A partial list of users is included. The other pamphlet describes the precautions to be observed in welding and cutting, giving complete instructions on the welding of various metals and the cutting of iron and steel. After a brief description of the way in which the oxygen and acetylene are generated and used, instructions on the care of the apparatus and the welding of various metals and a number of views of the apparatus in use are presented. The same arrangement is followed in the section dealing with the cutting of iron and steel.

High Phosphorus Slags for Fertilizer

A method of producing steel and high phosphorus slag is covered by a patent (U. S. 1,193,496—Aug. 8, 1916) granted to Anson W. Allen and Eugene G. Lilly of Birmingham, Ala. Instead of pouring off the high phosphorus slag from the steel made from the high phosphorus ores of the United States by the open-hearth or duplex process or the electric furnace and replacing this slag by a refinishing slag in the same furnace, as patented by William R. Walker, of the United States Steel Corporation, the patentees pour the metal and the high phosphorus slag out of the furnace into a ladle, from which the slag is poured off cleanly and completely. The slag is available then for fertilizing purposes. The metal thus "roughed down" is transferred to a refining furnace for ultimate refining or it is cast into ingots directly. The scheme provides for several roughing-down furnaces with a capacity in excess of that of the finishing furnaces, the excess capacity being used for the manufacture of high phosphorus steel. The process is described as really a triplex process consisting of first the converters, the roughing down open-hearth and then the refining, whether open-hearth or electric.

Hugh Obar of Washington and Charles M. Matthias of Frederick, Md., have been appointed receivers for the Morris Iron & Steel Company, Frederick, Md., on a petition filed by the president, John Mitchell, Jr. The plant will be continued in operation.